Landwards

@IAgrE

The professional journal for the Institution of Agricultural Engineers

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See iagre.org for the latest information

In this issue...

- Intellectual property
- Carbon, traffic and tillage
- Opinion – commercialisation of new developments
- Research round up
- Membership matters

AGRICULTURE HORTICULTURE FORESTRY ENVIRONMENT AMENITY

SocEnv
Society for the Environment

"The launch of REnvP is a landmark moment for environmental professionalism, providing more individuals with the opportunity to gain professional registration and achieve external verification of their competence."

Dr Emma Wilcox
Chief Executive Officer of the
Society for the Environment

Progress your career with REnvP

launched in partnership between the Institution of Agricultural Engineers (IAgrE) and the Society for the Environment is the new grade of Registered Environmental Practitioner (REnvP).

This is a huge step forward to ensure high standards of professionalism and proven competence are met by those working to enhance and protect the environment across every sector.

This registration is timely and relevant for agricultural engineering and the associated technology sectors and the intention is that professionals in the industry will apply. The industry includes many different disciplines which need people to apply a professional approach and the Registered Environmental Practitioner grade is ideal for this.

Why should I register?

- Improve your career and salary prospects
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- Join a network of dedicated professionals
- Demonstrate your competence and skills.

Register through IAgrE now:

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e: membership@iagre.org
w: www.iagre.org

Although the standards are high, IAgrE makes the process simple.

IAgrE

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Editor's Welcome

Despite, at the time of writing, just waving goodbye to storms Dudley, Eunice and Franklin in swift succession, the daffodils and crocuses are starting to poke their way through. I can't be alone in looking forward at this time of year?

Surely Spring is just around the corner.

This edition is all about ideas, specifically in Practice (p16) where we are expertly guided through the potential minefield of intellectual property and protecting rights. Likewise Alastair Tulloch's opinion piece (p42) on the commercialisation of autonomous and precision farming technologies is worth a read.

We get a tantalising vision in On the Horizon (p14) of the NexCo Carrier, showing how arable technology may move forward. Spoiler alert, some readers will remember similar solutions in the past which promised the same and didn't quite make it.

As ever, branch activity doesn't stop and we have enjoyed face to face and virtual presentations from the regions, which are reported on in Membership Matters (p32).

Some basics are needed to maintain our professional status as engineers, including accurately recording Continuing Professional Development, which needn't be a chore. Profession (p28) gives some pointers to help, alongside a member's testimonial to encourage.

I hope you find this edition stimulating and an insight into the wider life of the Institution. May I wish you well for the next few months.

Andy Newbold

Editor

andy@farm-smart.co.uk

LE-TEC are looking for its next champion technicians to be the voice of Land-Based Engineering for 2022

With two categories this year, one for someone who is just embarking on their career and one for someone who has made a successful career and seen their vocation develop. A host of exciting prizes are up for grabs.

Whether you're an apprentice technician just starting out, or a master technician with years of experience under your belt, LE-TEC are looking to hear from you.

Simply record a short video stating:

- who you are and what you do,
- how you got into this industry,
- what makes it so rewarding,
- and why others should consider it as a career.

Don't worry if it's a selfie style video, or a blockbuster production, it's your story they want to hear, and that's what could win the prize.
Submit your video to;

info@letec.co.uk

by March 28th 2022.

Prizes for 2022 include:

- City & Guilds certified Refrigerant Handling Course and City & Guilds Air Conditioning Course, for two winners kindly funded by AP Air Europe. This will include meals and accommodation.
- A Makita Radio kindly donated by Makita UK
- BAGMA Handover and Installation Training for two winners, kindly funded by Merlo UK Ltd. This will take place at the new Merlo training facilities and the prize will include meals and accommodation.
- Various tool and equipment prizes to be announced very soon!

Professor's decades of support and guidance recognised

"The evident lifelong dedication to nurturing, developing and promoting doctoral researchers from diverse backgrounds, in someone who is still doing so, meant he was the clear winner."

Decades of support, guidance and leadership to students from different backgrounds from across the world were recognised recently when Professor Richard Godwin was named Outstanding Research Supervisor of the Year at the Times Higher Education Awards 2021.

Judges were in unanimous agreement that the commitment of Richard Godwin, now a Professor Emeritus at Harper Adams University, to guiding more than 60 PhD students to successful completion of their doctorates made him a worthy recipient of the award.

"The evident lifelong dedication to nurturing, developing and promoting doctoral researchers from diverse backgrounds, in someone who is still doing so, meant he was the clear winner," said the judging panel, who added that Professor Godwin had "enabled countless candidates and postdocs to access his extensive network of international contacts, giving them both academic and employment advantages.

"Richard is well known among his supervisees for his openness to new ideas and for listening to and appreciating different opinions; yet just as impressive, if not more so, is the warmth and sincerity of tributes to Richard provided by his supervisees at all stages of their careers," they added.

Former students of Professor Godwin paid tribute to his mentorship while lending their support to his nomination, with one noting: "Professor Godwin, Dick, as we all call him, has always been very motivated, structured, detailed, helpful, supportive, he always has time for his students, gives them some space when needed and also works along them when things get difficult, as they always do in a PhD. From doing heavy calculus to digging soils and all the possible tasks in between, he can do it all!"

Another said: "One of the things I admire in Dick is that he does not simply see a student as someone who carries out the research, graduates and then has no further contact with them.

"Dick has always taken a keen interest in all his students, gives them maximum help and guidance whilst they are undertaking their research, and continues this during their career."

"I hope to continue my scientific path, and to become a supervisor one day - and I will do my best to mimic Dick's approach," said another.

Professor Godwin said: "I am honoured to receive THE Outstanding Research Supervisor of the Year Award and I thank my colleagues, current and former doctoral students for the nomination.

"The latter - from 21 countries - have now forged very significant careers in all aspects of agricultural engineering. I am proud of their achievements and when they say 'thank you – you have changed my life for ever!' it reminds us, as supervisors, we are not just fostering 'good science and engineering' but shaping the lives of future generations."

Professor Godwin received his award in front of nearly a thousand people who had gathered at the Hilton London Metropole hotel for the awards, which celebrated the higher education sector's recent achievements, not least its outstanding response to the Covid-19 pandemic.

NOTICE OF MEETING

Notice is hereby given that the Seventy-sixth Annual General Meeting of the Institution will be held on;

Wednesday 27th April 2022 at 11am

Class UK Saxham Business Park, Bury St Edmunds IP28 6QZ

Agenda

1. To receive and consider the minutes of the seventy-fourth and seventy-fifth AGMs held on 27th April 2021
2. To propose as an Ordinary Resolution: "That the Annual General Meeting authorises the Trustees of the Institution to review members' subscriptions and to make such adjustment, if any, as may be required with effect from 1 January 2023".
3. To receive and consider the Annual Report for the year ending 31 December 2021.
4. To receive and consider the Accounts for the year ending 31 December 2021.
5. To announce nominations for election to Council for the 2022/23 Session.
6. To re-appoint Landers Accountants Ltd, registered auditors, as reporting accountants and to authorise the Executive to fix their remuneration

By Order of the Trustees

Charles Nicklin, Chief Executive and Secretary
10th February 2022

NB: ALL PAPERS ARE AVAILABLE ON THE IAGRE WEBSITE

Presidents elections 2022

Last year the Executive ratified a new procedure for the Election of future IAgrE Presidents. To be eligible for election you must have first served as a Vice President on the IAgrE Council and Executive. Former Vice Presidents were approached last Autumn and asked if they would like to stand as President for the term of 2024-2026. Three agreed and their details may be found below in alphabetical order (by surname).

Vote with this link https://iagre.org/president-elections-2022 One vote per member – voting opens at 12 noon GMT on Monday 14 March 2022 and closes at 12 noon GMT on Friday 25 March 2022. If members do not have access to the internet they may telephone the Secretariat 01234 750876 and lodge their vote with Sarah or Alison or write to the Secretariat to arrive by noon on Friday 25 March 2022.

Prof Bruce Grieve, PhD, CEng, FIET, FIAgrE, FHEA

Chair in Agri-Sensing & Electronics, Director of the e-Agri Sensors Centre, University of Manchester: Before joining the University I gained c.20 years of industrial experience through an engineering career in global process and biotech companies, namely ICI, AstraZeneca and Syngenta Agribusiness. Principally in the fields of on-line analysis, control & sensors R&D; which then transitioned into the development and deployment of informatics systems within new integrated products for Sustainable Agriculture & Food.

What I feel I could bring to the presidency is a potentially different way of thinking about Engineering in Agriculture, both to the policy makers, in the private and public sector, and to the media, as a portal to public opinion. Exciting and attracting a new generation of entrepreneurial young engineers and scientists, from non-traditional engineering, life sciences and technology backgrounds, with the possibilities offered by careers in engineering for sustainable hi-tech farming.

Dr Mark Moore, FIAgrE

I have been involved in agriculture since I could reach the brake and clutch pedals of my grandfather's MF185 tractor. On leaving school, I briefly worked for Eastern Tractors as a service technical before I went to study agricultural engineering at Rycotewood College, where I gained an OND and HND. In 1990 I graduated from Silsoe College and started with Massey Ferguson (now AGCO) on 9th July as a technical training instructor.

My agricultural engineer skills have led to my current AGCO role of Director, Government Affairs. The aim is to increase awareness amongst policy makers on the opportunities to increase food production while mitigating climate change. Agricultural engineers are crucial to ensuring policies such as the EU Green Deal and UK ELMS, can and will be implemented successfully. This will be a team effort and achieved through talking to each other through organisations such as IAgrE, CEMA, AEA and Agri-EPI.

Hopefully you understand my passion for our industry. I would like to bring this passion to the IAgrE and use it to develop greater recognition for the good work we do safeguarding food security. It would be rewarding to me to give something back to an industry that has supported me in a successful career, which is why I continue to support the Douglas Bomford Trust as a trustee.

David R White CEng, CEnv, FIAgrE, MIMechE, FHEA

I grew up on a mixed enterprise farm. After gaining a degree in Mechanical Engineering and a Masters in Agricultural Machinery Design at Silsoe College, I became a research assistant at the Scottish Institute of Agricultural Engineering where I was part of a team obtaining operational data for agricultural tractors and combine harvesters.

I am a senior lecturer in engineering at Harper Adams University, I was a Member of the HSE Agricultural Safety Advisory Group (2002 to 2004), and a Trustee of The Douglas Bomford Trust (2012 to 2018). I am a jury panel member for the Helmut Claas Scholarship (2016 to date).

As we enter the era of Engineering 4.0 and Agriculture 4.0, there has never been a more exciting time to be an agricultural engineer. I am an agricultural engineer through and through and have made the IAgrE an integral part of my working career. It would be an honour to be President.

The full profiles are here:

https://iagre.org/president-elections-2022

2022 Claas Scholar announced

The 2022 Claas UK Scholarship for a Harper Adams University student has been awarded to Molly Robson, who is studying for a BEng in Agricultural Engineering and is the first female student to win this prestigious award.

Now in its 16th year, the Claas UK Scholarship was instigated in 2005 at the personal request of Helmut Claas and is awarded annually to a Year 2 Engineering Student at Harper Adams University.

As this year's Claas Scholar, Molly will receive £3,000 towards her education costs each academic year. In addition, she will do an initial three months placement with a Claas UK owned dealership, prior to a 12 month paid placement at the Claas headquarters at Harsewinkel in Germany. Here she will be working within the Advanced Functional Testing Department, focussing on harvesting machinery.

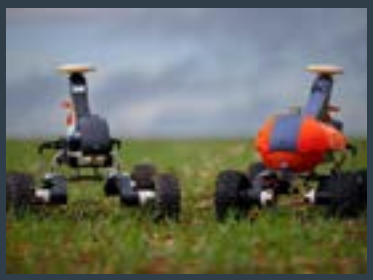
Prior to attending Harper Adams University, Molly studied at Askham Bryan College for a Level 3 Advanced Technical Extended Diploma in Land Based Engineering. Molly is from a farming background and lives with her family on an arable farm in Darlington. When she's not studying, Molly enjoys racing a V8 stock car, a sport she has been actively involved in since she was 12.

Summing up on how she felt to be awarded this year's Claas Scholarship, Molly commented: "To be a Claas scholar and have my placement with the company, is something I have wanted to achieve since I started my journey in the world of agricultural engineering. I am beyond excited for this opportunity, and I cannot wait to start this experience!"

Claas UK has enjoyed very close ties with Harper Adams for many years, both through the Claas Foundation, but has also sponsored PhD thesis and research work at the University and provides work placement opportunities for several students each year. Many of these have gone on after graduation to be awarded training and career opportunities at Claas UK.

New Robotics specialist interest group

The application of AI and robotics to agriculture has seen an explosion in interest and investment in recent years. In what is being heralded as the Fourth Agricultural revolution, there are increasing numbers of engineers and technicians involved in the development and use of robotic technology.



The application of robotics to agricultural problems will undoubtedly redefine the economics of food production and open new opportunities for farmers and farming methods.

The aim of the robotics and AI special interest group is to provide a forum for all IAgrE members to discuss, learn and increase their understanding of agricultural robotics and AI. The topics explored by the robotics special interest group will be both commercial and technical.

All Robotics and AI Special interest group events will be open attendance to encourage involvement and interaction from a diverse audience, however the back catalog of event recordings will only be accessible to IAgrE members.

The Robotics and AI special interest group is being headed up by Raymond King AMIAgrE, Lead Engineer at Small Robot Company and Kit Franklin C.Eng, MIAgrE, Senior Lecturer at Harper Adams University and Principal Investigator of Hands Free Farm.

For more information or to find out how to get involved please contact Sarah at the Secretariat.

From the CEO's desk

Despite being in a house with my Covid-infected children, my wife and I have yet to catch it; three doses of the vaccine seems to have done the trick for us! It does certainly feel like things are starting to settle down, which has finally allowed us to start getting out and about.

Tractors and tractors

In November last year, I was privileged to attend Case New Holland's Methane tractor event at the Basildon facility in Essex. The event had a number of stakeholders, such as key suppliers, consultants and customers amongst other guests. The delegates were treated to in-depth presentations on the methane technology, along with a factory tour, lunch and a

chance to drive the new T6.180 Methane tractor.

The tractor is now in series production and units will be in the hands of customers very soon. I really do admire CNH with what is a very bold step into alternative fuels for agricultural machinery.

Those of you that attended the Landwards conference would have seen Alistair Walshaw's presentation on the tractor, which is available on our website and YouTube channel. It's certainly many years since I was at Basildon, it's great to see such a clean modern facility, with an enthusiastic workforce, eager for new projects such as this to add to the factory's production volume. It is also great to see a project that's been engineered by the CNH team in the UK. I am sure there are more projects to come.

Whilst we're talking tractors, John Deere's latest launch of a standard configuration autonomous tractor has certainly created some discussion. I thought it was interesting that it was launched at the Consumer Electronics Show in Las Vegas, as opposed to the traditional farm shows; maybe to attract investors into agricultural technology? I certainly look forward to hearing more about the technology employed and the product being used commercially.

Professional technicians

With this ever-increasing complexity on modern machinery, it's essential the industry has high quality professional technicians to provide the necessary product support in the field; something I continually tell students. There is certainly some movement in the world of education.

A significant industry first was announced by Claas, they are the first OEM to take control and offer their own dealer technician training scheme in the UK using the apprenticeship standards. They will be welcoming students very soon.

Another announcement was made by CNH who, from October this year, will be putting their new dealer apprentices through the apprenticeship standards at Writtle University College, which is of course conveniently located near Basildon. This is great news for Writtle, who will be back in agricultural engineering education after a lengthy break, complete with newly updated facilities.

For those that maybe don't know, IAgrE stays very close to technician training through LE-TEC (Land-based Engineering and Technical Education Committee), where we collaborate with the AEA (Agricultural Engineers Association) as the trade body and BAGMA (British Agricultural and Garden Machinery Association) as the dealer body.

Amongst other activities, LE-TEC ensures things like the apprenticeships standards our industry technicians undertake have relevant content and this year there will be a significant review. LE-TEC have also been heavily involved in the new T-Levels for land-based engineering which are rolled out in England next year to replace the current full time technical courses.

Membership and registration

On an operational level, IAgrE has undergone a significant update of its membership and registration procedures to reflect changes introduced by the new UK SPEC 4th edition role out from the Engineering Council. All the work was completed by the year end and the various procedures are now up and running.

Special thanks go to Malcolm Carr-West, Alastair Taylor and Graham Higginson who have supported the updates. Whilst I'm thanking people, I would also like to thank those of you that have contributed to the IAgrE promotional videos. We have been going through the final editing process and the team is really looking forward to rolling them out very soon.

Please do check out the website, our social media and of course our new phone app to keep abreast of events that are coming up. We have some great speakers lined up for our Lunchtime Lectures and Podcasts, and by the time you read this we will have had our first Robotics Special Interest Group meeting, which I'm looking forward to.

Finally, many thanks for those that have paid their 2022 subscription and also a warm welcome to the new members who have joined this year, we hope you enjoy the content on offer.

Charlie Nicklin
charlie@iagre.org

Presidents Musings

It is just over 10 years since Sir John Beddington led the government Foresight report, 'The Future of Food and Farming – Challenges and Choices for Global Sustainability'.

The fact that this 200-page report, looking at the demands on global agriculture over the next 40 years, neglected to mention that agricultural engineers may have a tangible contribution to make in this area prompted the IAgrE, led by Peter Leech and Andy Newbold who were the IAgrE Presidents during this period, to formulate a response highlighting a number of areas where our profession was/could be contributing.

I have just re-read their document, a copy of which can be found on the IAgrE website, and their comments would seem to me to be as valid today as they were then. It is interesting that many of their highlighted areas, particularly in robotics and machine control in both field work and the dairy parlour have been adopted and really gained acceptance by commercial farmers.

Robotics drive

It was pleasing to see so much interest in the initial discussion forum of the newly-formed Robotics Special Interest Group with over 60 people joining on-line. The reduced number of immigrant farm workers being allowed into the UK post Brexit is generating urgent demand for automation by our farmers and growers at just the time that the technology is reaching maturity. As an industry we have a great opportunity to capitalise on this requirement. My thanks to Kit Franklin and Ray King for co-ordinating this meeting as well as to the all-female panel of experts, Rose Franklin, Rhian Griffith and Florence Laquzet who fielded the questions.

Food or nature?

The details that are now starting to emanate from Defra on the funding available under the Sustainable Farming Initiative seem to give little incentive to small and medium sized farms to really engage. It seems to me that the time, money and effort required to participate are unlikely to be justified by the proposed payments. Some clarity is needed on what the vision of the future is for land in this country. The NFU is lobbying hard to at least maintain our self-sufficiency in food production at the 60% level citing that in 1984 it was 78%. Conversion of productive agricultural land away from food production needs to be critically reviewed when large sections of the media seem to be driving a 'return to nature' or rewilding agenda.

This is the last of my Musings as President of the Institution before I hand over the role to Steve Constable at the forthcoming AGM in April. May I take this opportunity to sincerely thank the Secretariat for their work and flexibility during my two years of office. These have been challenging times, which despite giving few opportunities for getting out and about have nonetheless resulted in changes to our membership offering which I am sure will endure. The ability to hold meetings on-line whether in a pure or hybrid fashion make our annual conference and other meetings accessible to a much higher proportion of our members, wherever they are and whenever they have the time to participate which has to be a good thing.

Paul Hemingway
president@iagre.org

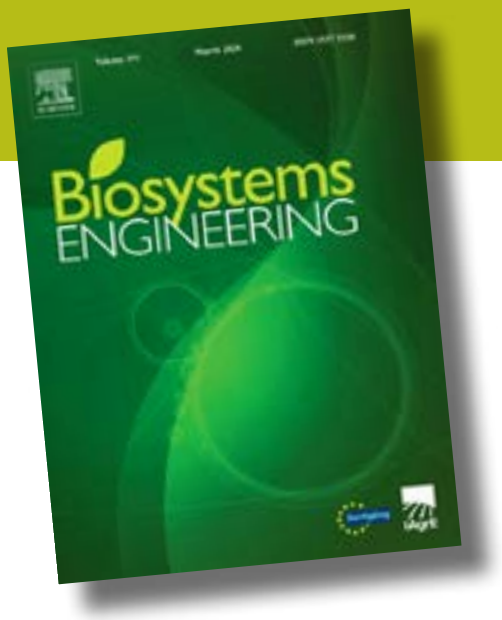
Biosystems Engineering

Biosystems Engineering, owned by the IAgrE, and the official scientific journal of EurAgEng, is published monthly with occasional special issues.

Head to https://www.sciencedirect.com/journal/biosystems-engineering to view the full article list of the latest edition and to find out more about depth and breadth of articles accepted for publication.

Reduced subscriptions are available to IAgrE members. Go to https://iagre.org/biosystemsinformation for details of the preferential rates for both paper and electronic versions.

The managing editor of Biosystems Engineering, Dr Steve Parkin, has kindly summarised a selection of papers published in the last three issues, which will be of interest to IAgrE members.



Biosystems Engineering

Volume 211, November 2021, Pages 219-229

Energy cost reduction by shifting electricity demand in indoor vertical farms with artificial lighting

Dafni Despoina, Avgoustaki George Xydis. Aarhus University, Herning, Denmark

Energy demand optimisation of indoor vertical farms (IVFs) with artificial lighting using load shifting is studied. The solution in agriculture of IVFs attracts interest; however, operating them without a plan is costly and inefficient. In this research, it was experimentally proven that by electricity load shifting on IVFs, it can result in a 16–26% reduction of artificial lighting costs for all months throughout the year, by simply selecting the times of the day that the required darkness will be provided to the plants (in this experiment, basil). Therefore, one could understand that mass deployment of IVFs within cities could minimise the operational costs, decrease CO2 emissions – since for many leafy products the production will take place in cities - and increase the number of agriculture-based jobs offered in the urban environment. Cash flow analysis of various scenarios revealed that possible investors in indoor vertical farms, in most of the cases, have a full payback period of their investment amount in less than 9 years, whilst in most of the cases the repayment period is as low as 2 years.

Biosystems Engineering

Biosystems Engineering

Volume 212, December 2021, Pages 273-289

A multiscale approach to estimate the cellular diffusivity during food drying

Zachary G. Welsh, Matthew J. Simpson, Md Imran H. Khan, Azharul Karim

Queensland University of Technology, Australia

Dhaka University of Engineering & Technology, Gazipur, Bangladesh

Theoretical models for food drying commonly utilise an effective diffusivity solved through curve fitting based on experimental data. This creates models with limited predictive capabilities. Multiscale modelling is one approach which can help transition to a more physics-based model minimizing the empirical information required while improving a model's predictive capabilities. However, to enable an accurate scaling operation, multiscale models require diffusivity at a fine scale (microscale). Measuring these properties is experimentally costly and time consuming as they are often temperature and/or moisture dependent. This research conducts an inverse analysis on a multiscale homogenization food drying model to deduce the temporal diffusivity of intracellular water. A representation of the real cellular water breakdown was considered and appropriate assumptions to represent its cellular heterogeneity, in relation to time, were investigated. The work uncovered that a linear decrease in intracellular water content could be assumed and thus a function for its diffusivity was developed. The proposed function is in terms of sample temperature and intracellular water content opening the possibilities to be applied to various food materials.

Biosystems Engineering

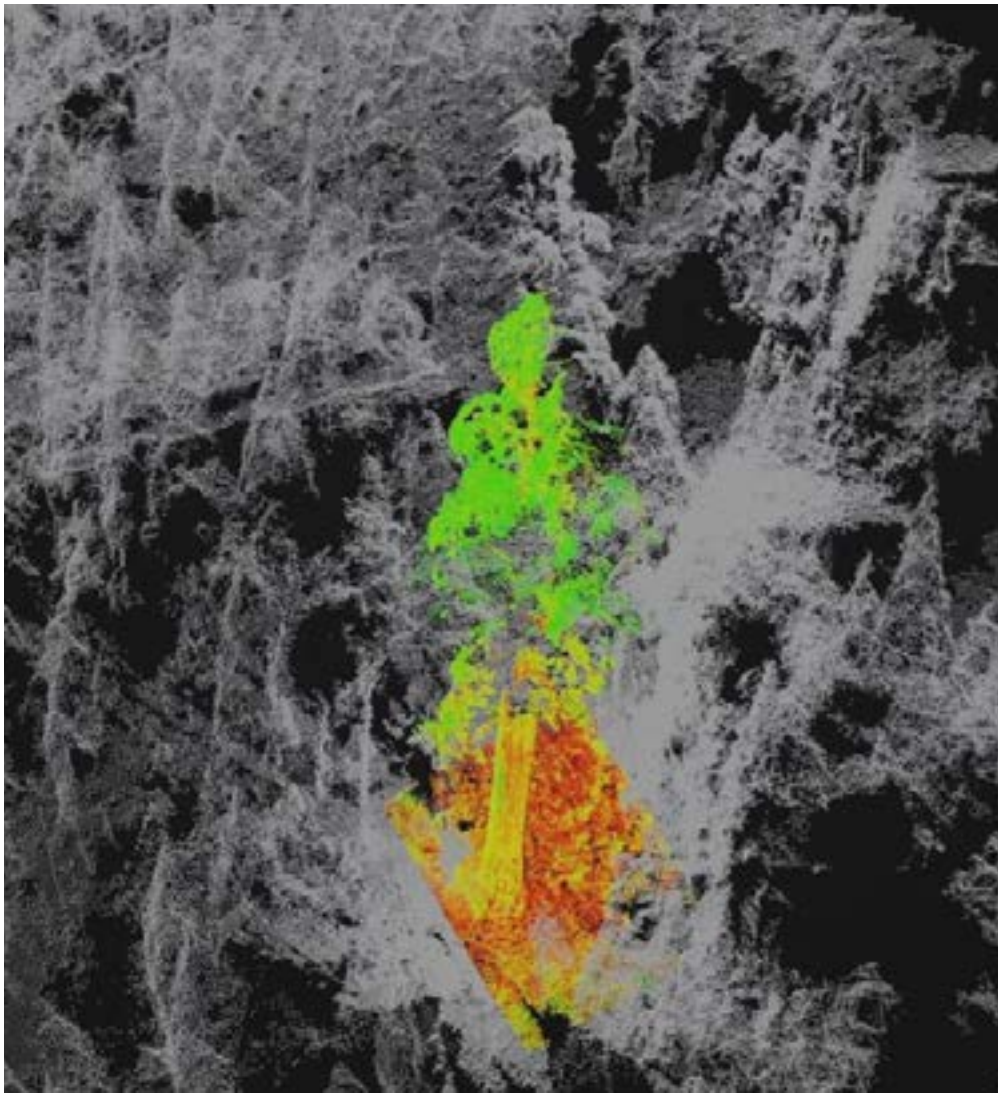
Volume 213, January 2022, Pages 76-88

Construction of 3D maps of vegetation indices retrieved from UAV multispectral imagery in forested areas

Juan Villacrés, Fernando A. Auat Cheein

Universidad Técnica Federico Santa María, Valparaiso, Chile

The construction of fuel moisture content (FMC) maps, as well as temperature, terrain topography, and wind speed maps, are essential for the development of fire susceptibility models in forested areas. Moisture distribution in tree canopies requires exploration and a three-dimensional representation. This paper presents the construction of FMC maps expressed as vegetation indices (VIs) in a point cloud. Multispectral images were captured by a camera mounted on an unmanned aerial vehicle to create the point cloud. VIs were estimated in the points that belonged to the forest canopy. To classify the canopy points, a combination of filtering of ground points and thresholding of VIs was evaluated. On such canopy points, random forest (RF), kernel ridge regression (KRR), and Gaussian process retrieval (GPR) regressors were investigated to estimate twelve VIs related to FMC. The input set of the models consisted of the points representing five wavelengths provided by the multispectral camera. The ground truth of VIs was obtained using a spectrometer. The results demonstrated that combining ground filtering and VIs thresholding for canopy points segmentation achieved a precision of 93.27%, recall of 95.65% and accuracy of 87.82%.



Forthcoming Events

IAgrE Western Branch

Western Branch AGM & Talk - CNH Methane Tractor

Alistair Walshaw will update us on the CNH Methane Tractor, which goes into commercial production very soon. Alistair, a member of IAgrE, is the CNH Tier 4 Ag Team Leader.

16/03/2022 - TBC

Lackham College, Lacock, Chippenham SN15 2NY

Going green: alternatives to conventional agrochemicals and how to protect them

About this event

When it comes to crop protection, the benefits of IP aren't just confined to conventional synthetic compounds. A new range of chemical treatments based on natural materials is being developed: from semiochemicals, including pheromones, to plant extracts and companion crops.

As innovators seek to secure investment for growth or protect their products in international markets, IP continues to play a critical role.

Going green doesn't have to mean going to market unprotected.

What you'll learn

Using real-world examples, this webinar will illustrate the different forms of IP available to agrochemical innovators as they embrace natural products. It will provide an insight into the benefits if you obtain IP protection – and the pitfalls if you don't.

- Practical considerations around obtaining IP protection for innovation using natural products.
- Top tips for identifying the IP in your innovation
- Myth-busting: clearing up some of the most common misconceptions about IP
- Obtaining IP protection on a budget
- What to do if your invention is copied

16/03/2022 - 1pm-2pm

Online

Lunchtime Lecture - Agricultural Science in the Caribbean

In April 2019 Marion Perrett-Pearson was approached by Macmillan Education (part of the Nature Springer group) to write a GCSE level textbook for agriculture students in the Caribbean. The deadline was August 2019 and included a trip to the Caribbean to write case-studies and take photographs. While plenty of people offered to carry her laptop, the Caribbean tour was 6 flights, 3 islands, 24 farm visits and 4000 photographs in 9 days! This talk is about the farming, farmers and students she met in the Caribbean islands of Trinidad, Grenada and Jamaica.

Marion Perrett-Pearson is a Senior Agricultural Adviser for Severn Trent, responsible for the Upper Avon and Leam priority catchments (in Warwickshire, Leicestershire and Northamptonshire). Marion works with farmers in these catchments to reduce diffuse pollution using Severn Trent funded schemes. Before working for Severn Trent Marion was Head of Geography in secondary schools and Chief Examiner of GCSE Agriculture and Land Use in Northern Ireland.

15/03/2022 - 1pm-2pm

Online via Zoom

On the Horizon

German company NeXaT GmbH won the DLG Agritechnica Gold Medal award for its unique NeXaT, which is a carrier vehicle that can carry all implements needed for tillage work.

This saves time and money compared to travelling to fields each time with a tractor and implement but is essentially designed for larger arable farmers.

With the 12-metre version, the system is designed such that 95% of the total field area is never driven on in the envisaged bed mode, resulting in high yield potentials with good soil and environmental protection.

The NeXaT is designed as an autonomous working machine, equipped with a peripheral monitoring system. A cab that can be rotated by 270° is available for process monitoring. This establishes the basis for fully automated machine operation and enables manual vehicle guidance during transport.

The integrated implements are mounted between the four large, electrically-driven track running gear units, which can be rotated by 90° for travelling by road. At present, power is supplied by two independent diesel engines, each offering an output of 400 kW/545 hp, with generators. The vehicle is designed for alternative drive technologies such as fuel cells.

With the integrated NexCo combine harvester module, the NeXaT achieves grain throughputs of 130-200 tonnes per hour. The innovative dual axial flow concept uses a 5.8m long axial rotor mounted transverse to the direction of travel.

The flow of harvested material is introduced centrally into the rotor and at a tangent to achieve energy

A new take on an established idea

efficiency. The rotor divides it into two material flows. This enables roughly twice the threshing performance of conventional machines and establishes the prerequisite for uniform straw and chaff distribution with two choppers, even with a cutting width of 14 metres.

Grain delivery is ensured by a 32m³ grain bunker, as a result of which the combine harvester unit does not require a transfer vehicle on normal-length fields. Transfer to the transport vehicle can take place on the headland with an unloading capacity of 600 litres per second.

Does this remind readers of a certain age of anything?

First commercial agreement for fossil free fertilisers

Yara, a leading global fertilizer producer, and Lantmännen, northern Europe's leading agricultural cooperative with operations from field to fork, began testing the commercial viability of green fertilizers in 2019 with a common goal to realize the world's first fossil free food chain.

The collaboration has resulted in a commercial contract for green fertilizers, which will be produced by Yara and marketed by Lantmännen in Sweden starting in 2023.

Instead of using fossil fuels such as natural gas to produce ammonia – the building block of mineral fertilizers – the green fertilizers will be produced with ammonia based on renewable energy produced in Europe, such as Norwegian hydropower. The result will be fertilizers with an 80 to 90 percent lower carbon footprint. Yara has a portfolio of green ammonia projects, which will be key to producing green fertilizers, in Norway, the Netherlands and Australia, and is working actively to expand its clean ammonia business.

"Our partnership with Lantmännen to bring green fertilizers to market is crucial for decarbonizing the food value chain. We have to transform the food system to deliver on the Paris Agreement, and this will require collaboration across the entire food chain instead of working in silos. The Yara-Lantmännen partnership is a concrete example of how this can be done," says Svein Tore Holsether, President and CEO of Yara.

Practice

Protect that property

Intellectual property (IP) can be the most valuable asset a company possesses and a key tool to achieving growth, provided it is protected properly.

Many of the machines farmers already use multiple parts and assemblies that are covered by patents or registered designs, Robert Carpmael, partner at intellectual property specialists Marks & Clerk, told an IAgrE webinar. "A machine, like a sprayer, will have many different types of IP covering many different areas."

Talking after the seminar, he said IP cover is very broad and can include patents, trademarks, copyright, plant variety rights and registered designs: "Copyright prevents competitors from unauthorized

Robert Carpmael, partner at intellectual property specialists Marks & Clerk LLP

Credit: Knight Farm Machinery

Many machines contain multiple parts and assemblies that are covered by patents or registered designs

use of information from product manuals and brochures relating to the patented item."

A rights issue

Securing or registering IP enables a company to protect its innovations against competitors in support of its own sales, or to license them so that competitors can use them for a fee.

Patents secure monopoly rights over an invention for up to 20 years, subject to payment of renewal fees, which enables the holder to prevent third parties from using the item or design.

They also enable holders to sue infringers for loss of custom (damages), and for any profits the infringer may have made selling the relevant items.

They also enable them to gain injunctions against future infringements by that infringer.

From a business point of view, they are also able to be used to gain innovation and development grant funding, and to attract investors.

Practice

Protection

The fact that one patent exists can also be used to block later applications for very similar ideas.

If there are multiple holders in a given sector this can create a 'patent cluster', which can make it much harder for a competitor to enter the sector.

But there are rules against anti-competitive behaviour, so separate IP holders cannot co-ordinate between each other:

"An initial patent application gives applicants 12 months' global protection. Thereafter they need to decide which territories it is important to seek protection in and which not.

"IP tends to be territorial, covering single countries or regions.

"And applicants should not assume they will receive a granted patent in every country they apply for, because the standards applied – or the prior art considered - may be different".

Very often the decision on which countries to proceed in comes down to available finance, as filing in multiple countries and funding the resulting examinations can be very expensive.

Be prepared

Anyone seeking a patent should be aware of the costs involved, with a significant part being the initial application cost.

To support their application, they should keep a detailed and dated record – including any written material or drawings – so that, in any dispute, they could prove what they were working on and how long they had been doing it.

And they should be well prepared before they approached a patent agent: "Be ready so you can speak to them about exactly what you have. If you only give them a vague description of an idea then they will have to do detailed work which is an extra cost.

"Your description of your invention can reference existing patents or products in the sector, which gives the attorney the chance to crystallise how the invention differs from them.

It was also important for the applicant to ensure the agent knew if there were any budgetary constraints on the project.

A patent breach?

When taking action against anyone breaching a patent, stopping their business was not the only option:

"Don't always try to put them out of business. You could use the circumstances to strike a licensing agreement and use the additional income to help expand your business."

Before taking action against an infringer, the holder should always gather as much information as they can, and certainly never approach the other party before discussing any potential action with an attorney.

But Robert warned that those against whom action is being taken could always contest the case and launch a counter action, including action against unjustified threats.
And potential applicants can use existing IP applications as part of their research:

"Look through public patent records and see what ideas other people have considered.

"If the patent is over 20 years old, or it has become abandoned, you may be able to use that technology as the IP protection may have lapsed.

"Even if somebody lodged a patent application just three years ago and has abandoned it, you may be able to use it.

"But you should still beware of other patents and IP in the sector that could cover such technologies. Sadly, the situation is not always black and white.

"But there are ways in which potential applicants can avoid a lot of research and development time and cost if someone has found a solution and not protected it."

He recommends the following link – to the European Patent Office's website:

https://worldwide.espacenet.com/

The Landwards podcast

A series of podcasts have been commissioned with a monthly news podcast and a monthly interview with an agricultural engineer or influential person in the land based sector. The Landwards podcast is on iTunes, Spotify or click on https://www.buzzsprout.com/1067353/episodes for the latest one.

Novel and innovative

To be patentable in the UK any idea has to be novel and innovative(ie not obvious) and have a practical use. It does not need to exist in physical form but it must be achievable. If it's just an idea it may not be patentable.

One important aspect is that it must not have been shown in public – known as 'public disclosure'.

That last aspect was a key to the recent court case between drill manufacturers Claydon, who sued Mzuri for breach of patent over a design feature.

The case was decided in favour of Mzuri because Claydon's design had been tested in a field with a public footpath running through it, which the court said meant it had been shown in public.

Mr Carpmael pointed out that this could make field testing very hard – especially for inventors in Scotland, where the country's 'right to roam' effectively meant that no field could be viewed as a secure place to test a machine.

Technical:
Soil & Water Management Centre - carbon conference


Dr David Powlson

Soil 22 – Carbon, traffic and tillage

Farming's environmental impact and its ability to sequester carbon is under the spotlight like never before with much talk of soil protection, management and making carbon pay. This year's Soil and Water Management Centre conference focussed on these issues with a group of leading farmers and researchers.

Carbon for crop stability

Sequestering carbon into farmland could ensure stable crop yields in future, David Powlson from Rothamsted Research told the event.

While it cannot guarantee increased crop yields it does have several other benefits:

"Increasing carbon will help yield stability and the soil's physical properties."

But he reminded farmers that soil carbon levels do not increase indefinitely. The greatest gains come in the early years, but those gains can be lost in later years.

But even a small increase in levels can have a significant impact on the soil's physical and biological properties.

Thinking on the subject, has moved on significantly since the 1980s and 1990s, when the favoured option was to remove land from production.

Credit: Farming Photography

Sequestering carbon into farmland could ensure stable crop yields in future

Now the focus is on how to sequester carbon in land that continues to be cultivated.

Dr Powlson rated some options for their carbon-sequestering merits:

- **Cover crops:** Valuable because they capture some carbon via photosynthesis which is better than leaving bare soil, but they don't fit all systems.
- **Retaining crop residues:** Yes they achieve some transfer of carbon from atmosphere to soil, but there are often other uses for straw.
- **Manure:** Not an extra movement of carbon from the atmosphere to the soil, but it increases soil health and saves nutrients.
- **Zero tillage:** Does play a role, but mainly beneficial for other factors like improving soil structure, water infiltration and earthworm numbers.
- **Arable/grass rotation:** This can raise soil carbon, benefit soil structure and help recycle nutrients in manure. But it does risk making managing the arable farm more complex and cutting crop production, which has implications for food security unless that is made up for somewhere else.
- **Rotations and inter-cropping:** Potential benefits but depends on how easy it is to manage.
- **Agro-forestry:** This can increase carbon capture but requires more management and cannot be done overnight.

One key to improving the industry's carbon profile is using fertiliser more efficiently, harnessing the available decision support systems, and using soil-carbon friendly practices as far as possible:

"Any removal of land at scale has implications for food security.

"Food that isn't grown here might be replaced by food grown elsewhere, possibly in a less stable way.

"Sequestering carbon is not an alternative to avoiding emissions; they should work together."

Technical:
Soil & Water Management Centre - carbon conference

11% of respondents … prevent or delay f…

Questions on sequestration

Many farmers are already doing some activities that help sequester carbon, suggests a survey completed at Harper Adams University.

But a range of issues - including financial barriers, lack of knowledge and uncertainty over future government policy – is preventing more being done.

The survey, completed in 2021 by PhD student Lucinda Williams, highlighted the activities already being done, said Dr Jonathan Cooper when presenting it to the conference.

Of 110 respondents, 80% were already practicing techniques that sequester carbon.

These included rotational grazing;

said there were no barriers at all to urther carbon sequestration efforts

About the Soil and Water Management Centre

The SWMC is an agri-research and industry-led initiative to help UK farming make the most of its two most precious assets: soil and water

The SWMC is a central source of soil and water management information and expertise, and a national forum for establishing essential improvement priorities.

- Making practical soil and water management training and advisory materials widely accessible and co-ordinating farm-based workshops and demonstration projects.
- Instigating and supporting applied soil and water management research addressing particular challenges and improvement opportunities.

Based at Harper Adams University, the SWMC works hand-in-hand with farmers as well as key research and training providers for the greatest overall industry value.

Soil & Water Management Centre

planting woodland; managing hedgerows; cover cropping; direct drilling or zero tillage and sowing legumes:

"Over 40 individual techniques were identified," Dr Cooper reported. Of the other 20% respondents, half said they were not doing anything, and the other half were not sure. When asked what they were most likely to do, 67 of 110 identified reducing soil disturbance.

Sowing improved grass species/ legumes and integrating livestock into the rotation to reduce fertilizer requirements were both identified by just under 60 respondents. While about half would consider introducing rotational grazing and planting woodland.

The biggest single barrier was finance, cited by over 70% of respondents.

Around 30% of those surveyed also cited lack of information - and political uncertainty.

That was stifling potential progress, he suggested: "There is a reluctance to implement further climate change methods until there is more information on financial benefits."

Despite that, he points out that 11% of respondents said there were no barriers at all to prevent or delay further carbon sequestration efforts.

People:

Alastair Tulloch

The

A Claas Career

A career which is founded on a mixed farm upbringing is always a good start. This farming background is where Alastair Tulloch's enthusiasm for all things mechanical first developed. Members of the IAgrE Western Branch were fortunate to find out more in a recent meeting. Mike Whiting reports.

Following school, Alastair progressed onto a Cambridge College for a two-year engineering diploma course. This included six-month secondments with both Ransome's and Sperry New Holland, both big names in the industry during the late 1960's. Hands-on experience with the Cavalier combine in the 'blue' corner and disc mowers with the 'red and yellow' team exposed Alastair to both cereal and grass harvesting equipment. The NH disc mowers were prototype at the time and in initial field testing. In these early tests, with an unforgiving environment, issues always seemed to develop after 49 hours of use! These investigations develop engineers' skills in root cause analysis, enabling a better design of component and overall assembly.

Claas Xerion was re-developed as a replacement for the Challenger

Summer job

In 1968, Alastair took a 'holiday' job with Manns at Saxham which became a valuable unofficial apprenticeship. Alastair then took a one-year National Diploma course in Agricultural Engineering at Writtle College. Projects formed part of the syllabus and Alastair was tasked with designing a feeder system for a baler. Little did he realise that this specification of farm machinery would be a focal aspect throughout his career.

The 'harvesting gap year' took Alastair to Canada in 1971 after

Alastair Tulloch

leaving college. Some experience with a John Deere combine was awaiting him on the prairie farm which was owned by relatives. Alastair experienced the humorous side of the family clan when working there. He noticed there was no filling hatch in the roof of a small grain silo. His uncle took one look, fetched a shotgun from his truck and blew a hole in the roof! As they were showered by dust and dirt he muttered "there's a hatch now!"

Returning to the UK Alastair was lured back to the light green business logo of Manns, which seemed to be the only option at the time. His role involved demonstrating machinery and learning to become an instructor in the training centre. In 1976 he applied for the position of field service advisor for East Anglia and the South East of England within Manns. In 1980, Manns became part of the Claas family, when they bought the business from Howard Machinery and it became 'Claas UK Ltd.'

Higher capacity

Advancements in technology resulted in the development of more complex, higher capacity agricultural machinery. This brought all the aspects of 'after sales' together in one division to support product in the field. One aspect of this function was to discuss field performance results with Claas factory engineers. Skills in diplomacy and tenacity paid off as the UK reports began to receive a good airing, since they included a lot of detail and analysis, with the purpose of contributing to continued product improvement. This allowed dealer service managers to feedback developments to customers. Managing communication helped to smooth relationships where product performance had been an issue and ensure these points were satisfactorily dealt with.

The 1990's was a challenging time in agriculture with margins under increased pressure. Customers were demanding more reliable, efficient and comfortable machine specifications. This increase in product complexity necessitated improvements in all aspects of dealer training. Fully functional bespoke machine rigs were built for combines, foragers and other products in order to aid training.

Machinery rationalisation

Many will remember the introduction of set-aside in the early 1990's which, along with other financially-driven factors, forced the agricultural machinery sector to rationalise. This led to more consolidation and amalgamations amongst leading industry suppliers. The effect of these changes in the UK market led to more dealer network exclusivity in aligning their outlets to 'full line' suppliers. Since Claas were often second to the tractor franchise in dealer revenue, they were obliged to quickly re-evaluate their future distribution strategy. Claas decided to start an ambitious programme developing its own dealer network, focused on harvesting products in key locations. What evolved was fewer but larger multi-branch dealers, each marketing across bigger areas. In all it took some 20 years to fully develop, complete and improve, but it resulted in a well-managed quality network to call its own.

People:
Alastair Tulloch

The Lexion combine

The first Lexion combine in the UK pretending to be a Commandor!

By the mid 1990's Claas had developed the completely new Lexion combine harvester. It included a computer terminal operation using a CANBUS system and telematics providing yield mapping and data recording, which were all new for combines at that time. The model's success over the late 1990's established a market dominance at a time when total market numbers were falling. Again, the increase in product complexity required renewed emphasis on training, to cater for computer diagnostics and precision farming technology, which was beginning to form the basis of efficient agricultural production with leading customers.

Into the tractor business

Other new developments followed such as the joint venture with

The first Lexion in the UK - 1995 (before it got a name)

Caterpillar to market the rubber-tracked Challenger in Claas livery. This proved to be a good fit with customers farming larger enterprises and acted as the catalyst for Claas to head into the tractor market in order to offer the network a full line of products. In 2003, Claas purchased Renault Agriculture, which was a big development for the business in every major market. The Claas Xerion was re-developed as a replacement for the Challenger as the marketing agreement with the US construction machinery manufacturer came to an end.

Commercial challenges

Entering the 2000's required machinery marketing to become more business orientated and new methods of operation had to be developed to sustain market shares. Claas UK established a dealer council which enabled full analysis of all business options to enhance efficiency and try to grow market share. Farmers requirements for 'downstream' products such as netwrap, batteries and oil were added to the catalogue of business objectives, for mutual benefit as part of the after sales offering.

The challenge to recruit and retain quality staff was paramount in providing the service support customers expected. This could only be maintained by 'growing' youngsters through a modern apprenticeship programme. Alastair was fully involved with new programmes established by Claas UK as well as the national 'Trailblazers' initiative in 2013. This dovetailed with the industry initiative of Landbased Technician Accreditation (LTA), which was being developed to introduce more quality and professionalism into product support functions.

In retirement, Alastair continues to be involved with the Claas scholarship foundation scheme, which offers financial support for graduate students closely associated with the industry. Students from several universities in different countries enter their dissertations each year for the judging panel to assess.

The IAgrE mentoring scheme

If you would like some friendly support with your career, the Institution can help in the first instance have a look at

https://iagre.org/mentoring

Profession:
CPD

Continuing professional development and you

As a professional institution, IAgrE has a commitment to providing a range of Continuing Professional Development (CPD) opportunities for our members and we hope you agree that we have improved and extended this offering over the past two years, with the introduction of Lunchtime Lectures, virtual branch meetings and podcasts.

CPD is far reaching and personal, all careers are different and needs vary but usually fall into one of the following categories:

A. development of technical expertise and knowledge relevant to one's profession.

B. extension of technical and managerial skills beyond the

CPD or lifelong learning is applicable to all professionals, no matter what stage of your career.

participant's normal field.

C. development of professional life skills and knowledge such as languages, finance, law, etc.

CPD or lifelong learning is applicable to all professionals, no matter what stage of your career. In early/mid-career recording your learning can be very useful for appraisals; a living CV, detailing your skills and increasing knowledge. As you gain experience the need for formal learning perhaps reduces but knowledge and skills are always growing and changing, and we would like you to record how you keep up to date.

CPD activities

Activities which can be counted as CPD include conferences, courses, workshops and seminars, organised visits, writing articles or papers, IAgrE committee work, IAgrE technical meetings, professional updating by reading or private study, secondments and exchanges, further education, distance or open learning, podcasts, YouTube videos. Visit iagre.org/cpd for details of requirements and recording information. Login to the website and follow this link for lots of suggestions for CPD activities:

iagre.org/cpd-resources-and-ideas.

The Institution has an obligation to sample and review our members' CPD and if you are professionally registered with either the Engineering Council or the Society for the Environment this is a requirement of continued registration.

Our feedback has been very positive. We have reviewed a variety of CPD files; ranging from some of our younger members, who have compiled some very impressive records that will help them as their careers develop, through to some of our more senior members who have presented records that meet the CPD requirements but are perhaps less concerned about the detail.

As we all know the completing and recording of CPD is fundamental to demonstrating our professional status and the on-line IAgrE recording facility can help in chronicling the opportunities taken. Don't forget that the new IAgrE App allows you to quickly note CPD that can be revisited with detail later.

Don't panic!

IAgrE is about to launch its review of CPD for 2022. This is a sample, randomly generated, of professionally active members and will include those who were unable to submit their CPD during 2021. If you are selected for review, then Sarah will be emailing you in the next week or two to explain the process. Please DO NOT PANIC! If you have any questions or concerns or need clarification on any areas of CPD please contact us and Sarah and the Professional Development Committee will guide you through the process.

Profession:
CPD

A personal view on CPD - Graham Smith

Msc CEnv IEng
MIAgrE CFIOSH FIIRSM
MIMI FRSPH

I studied agricultural engineering at college working as an agricultural engineer for many years, this practical experience has been invaluable. I moved to health and safety, then to Health Safety and Environment consultancy as Principal Consultant with Aviva Risk Management Solutions, then joined National Grid as the SHE Technical Leader.

Why Continuing Professional Development

As we move through our careers we learn and become more diverse in thoughts and processes, we pick up traits and learned behaviours from others and in turn pass those to our peers, those we mentor and those we meet in society. If someone asked what I learned over the years and how that benefited my career, without a CPD record I would struggle to give an accurate account. To a certain extent this is what we face at some time perhaps at review or appraisal, CPD will help. All institutions require members to record development through CPD with different criteria recording in hours or points over a period of 1 -3 years. The benefits are, clearly demonstrating your career development, and keeping abreast of changes in your profession. There is a requirement on all EngTech, IEng, CEng and CEnv to record CPD.

As we develop our careers, we need the ability to show how we have learned from our training and experience, great if we had somewhere to store information to demonstrate our development, well, that is the CPD system.

Record information that can be referred to and audited demonstrating our progress. It's fantastic to learn and develop but when asked "what did you learn from that?", is not so easy; reflection on what we learned is a key part of CPD. Reflecting on experiences is a trait we as humans have learned from an early age, recording, and reflecting on learning is key to a good CPD record.

What constitutes CPD?

CPD is about your development. Regular tasks or meetings with no new learning don't require recording.

New experiences are superb for CPD, doing a task for the first time, record it, ask yourself what went well, what could be improved, even if it didn't go to plan, many successful designs come from a scrap bin full of good ideas.

IAgrE events including lunch time lectures, on subjects as diverse as robotics, soil conservation, controlled traffic farming, and local branch events are always of interest, when you're studying for qualifications, add them to your CPD record. Refreshing skills such as abrasive wheels or training through Bagma, Lantra or NPTC. IAgrE website has links to CPD resources and opportunities to attend learning. Use these occasions to build, knowledge and identify what you need next. Make CPD part of your development conversations at work.

How to record CPD

Recording CPD is easy with IAgrE. Log on to My Career Path, CPD recording through the IAgrE website. Dont forget your membership number. IAgrE can help if you can't remember it. There is a spread sheet with examples available on the web page. I tend to use Word then paste it into my Career path, I can re-enter the information easily should I lose connection. Upload evidence such as certificates.

Studying professional qualifications or upgrading your membership status in environment or engineering, aligning your CPD against the membership criteria helps when developing your professional registration with Engineering Council or Society for the Environment.

Top tip:

Update CPD regularly it is easier than looking back through your calendar and trying to remember information later.

Profession:
Apprentice News

Writtle University College to deliver CNH apprenticeships

Global machinery company, CNH Industrial (manufacturers of Case IH and New Holland agricultural machinery), and Writtle University College (WUC) in Essex have announced an exciting new partnership.

From September 2022, the CNH Land-based Service Engineering Technician Apprenticeship programme in England will be delivered by WUC's knowledgeable team.

The Apprenticeship Standard will be delivered via block release and provide agricultural engineering training for leading national and international companies. Apprentices will benefit from expert tutoring on WUC's land-based estate, just two miles from Chelmsford and close to CNH's Head Office in Basildon.

WUC's Director of Further Education, Faye Burrage, said: "Writtle University College has a long history of producing industry-ready students for land-based sectors. We're delighted to be working with CNH to train the agricultural engineers of the future. The courses will be an excellent addition to our existing portfolio, which includes established apprenticeship, college and university courses."

Up to 30 apprentices will join the programme on a yearly basis to study the Land-based Service Engineering (LBSE) 'Technician' Level 3 Apprenticeship.

The course will combine the skills, knowledge and behaviours that the apprentices will need to thrive in this exciting subject and to prepare them for their future careers.

Apprentices will be supported by WUC's well-established student support and wellbeing services, to help them make the most of student life.

Mark Barnes, CNH's Manager of Product Support and Technical Training for the UK and Ireland said, "We are proud to combine CNH's knowledge and WUC's educational experience. Land-based engineering is an exciting, fast-paced sector and an essential part of supporting our customers in the field."

"WUC and CNH's UK headquarters in Basildon will work closely together to ensure we offer people enrolling on the program the best experience and platform to start an exciting career."

"Apprentices can look forward to working with technologically advanced machines in a fast growing sector. They will join an industry known for its job security and carry forward our reputation for efficient, reliable service."

CNH Industrial is a global leader in capital goods. Its 12 brands make the vehicles that keep agriculture and industry growing and employ more than 64,000 people in 180 countries.

WUC has been teaching land-based courses since 1893. Its programmes put science into practice with a combination of expert theory and practical experience.

Membership matters

Northern Ireland Branch

Branch Zoom meeting on tractor trailer braking

Report by Terence Chambers

Dr Andy Scarlett was the guest speaker at the most recent Zoom meeting for the Northern Ireland Branch of IAgrE. He is well known as an agricultural engineering consultant, who previously spent 16 years on the staff of the former Silsoe Research Institute, and now trades as Scarlett Research Ltd based in Norfolk.

More than 10 years ago, the Agricultural Engineers Association first published the "Look behind you" guidance booklet. It was based on Dr Scarlett's research findings at the time which showed how tractor travel speeds were increasing but many trailer braking systems were inadequate to cope with the braking effort required. As well as the safety implications, the fact that most of the braking effort had to be provided by the tractor resulted in premature wear.

This required expensive brake replacement on the tractor and was a cause of concern to both users and manufacturers. Adequate trailer brakes could have taken much of the load and been relatively simple to access, service and repair. The research information and guide effectively informed users and established the need for well maintained and effective trailer brakes.

Since then, the trend to larger, faster tractors towing bigger trailers has continued. Trailer braking systems have evolved but the laws of physics still mean that whilst required braking effort increases with increasing load, the effect of faster travel speed is much greater. For example, if increasing the travel speed by 50% from 20 mph to 30mph (with the same load) the braking effort goes up by 225 % !

The latest AEA "Look Behind You" guide.

It was published in November 2020, based on the latest research findings and guidance from Scarlett Research Ltd and funded again by a widely represented group of trade and support industry interests. This readable and very well illustrated guide is an important and welcome tool for farmers, farm managers, tractor drivers, farm mechanics and dealership technicians. It describes the specifications, properties, maintenance and operation of the available (both hydraulic and pneumatic) trailer braking systems and their matching tractor control systems. It also explains the role of load sensing systems and ABS in matching the most efficient braking effort for the trailer loads being carried. This impressive document is now freely available both in hard copy and online at https://aea.uk.com/look-behind-you/

Presentation

Dr Scarlett's presentation was titled "Tractor Trailer Transport - Rules, Regulations and Reality". It linked his research information, from within the latest guide, to the design standards and use regulations for the braking systems on tractors / towed implements within UK and across the EU. European type approval sets standards for the items produced there and this has an influence for the markets supplied. An example is the 2018 "Mother" regulations specifying enhanced safety features on agricultural tractors including the facility of being equipped with proportional braking action to support simultaneous (both dual-line hydraulic and dual-line air) systems for trailers and other towed implements. The requirements for supply and use within Northern Ireland broadly follow the UK pattern but there is often a time lag of 1 year or more. From 2016 an agricultural tractor (as used within agriculture, horticulture and forestry) can travel at up to 40 km/h (25 mph) but above this speed more stringent standards apply. In terms of vehicle testing. Agricultural tractors within certain EU member states can travel at up to 60 km/h (37 mph) but are limited here to 40 km/h unless they have all-wheel suspension. JCB Fastracs and Mercedes Unimogs, with their ABS and commercial vehicle standard braking systems, are the only current examples in use in the UK.

Most of the main agricultural trailer manufacturers now offer a range of further technical options including dual-line hydraulic and dual-line air brakes, ABS and load sensing. The onus is on customers to choose and maintain the appropriate trailer specification for their own work conditions.

The UK standards, for weights and travel speeds have been updated recently in 2015/16, but could have gone further. There is a feeling that apparent lack of urgency, in adopting the latest technology, may be associated with general public disinterest in the subject. The farming lobby may also be reluctant to support moves to formalise more stringent regulation for its members. Fatal road accidents, when other vehicles collide with farm vehicles, do occur. Loss of control of a tractor trailer combination seems less likely to hit the headlines or result in prosecution. The maximum permitted combined tractor and loaded trailer weight is currently 31 tonnes. A laden trailer should not exceed 18.29 tonnes including its hitch load. With increasing tractor and trailer sizes (14 to 16 tonne load capacities are now common) the loads carried have tended upwards and in use may now exceed the current legal limitations.

By contrast, in 2016, our nearest EU

neighbours in Ireland's Road Safety Authority updated their rules for the use of farm trailers on the road.

They permit 2 axle tractors up to 18 tonnes and trailers carrying up to 10 tonnes per axle. Trailers over 17 tonnes load capacity require a flexible suspension system. Maximum hitch load is specified (3 tonnes for the hook type pick-up hitch and 4 tonnes for the 80mm ball and spoon versions). Where speeds exceed 40 km/h or if the combination is used outside of the agricultural definitions further controls such as MoT type inspections may apply.

Discussion period

An informative and enjoyable discussion period took place around some of the relevant subject areas.

Branch chairman Ken Gardiner then closed this informative and most enjoyable meeting by thanking Dr Scarlett for sharing his knowledge and professional experience, on this very important subject, in such an inclusive manner.

Note, whilst this presentation was not recorded, Dr Scarletts lunchtime lecture on the same subject from May 2021 is available to watch again here: https://bit.ly/3v5n8mX

YouTube

Membership matters

SuperTom

Wrekin Branch

The Small Robot Company – Ray King, Lead Mechanical Engineer

Report by Bill Basford

Ray described the development of the company from 2017 and of small robots which already within the industry have made their name as Tom, Dick and Harry. In fact these names linked more to the robot function rather than totally different machines. He outlined and illustrated the early development of a micro robot in the evaluation stage across typical agricultural landscapes and the challenges involved.

The use of the word Tom is really linked to the robot development in the 'scanning' function. The word Dick to the weeding phase and Harry relating to planting.

The early evaluation of small robots started with one weighing only 12 kilogrammes and a forward speed of 0.4 m/s. This developed up to a version known as the V 1.0 which dramatically increased the weight to 450 kg. Forward speed was increased to 0.5 m/s and this version included 4WS and 4WD. However, it was soon found that the weight was too great and an intermediate development now known as the V 3.0 weighing 232 kg with the ground pressure of only 33 kPa and forward speed of 1.5 m/s allowed better daily capacity based on 3.24 hectares per hour. Scanning at this stage involved up to 6 cameras.

Ray described the processes of development and validating all systems within each robot unit. This included drive torque calculations, steering torque testing, contact patch and tyre deflection, boom (carbon fibre) load and structural calculations as well as understanding the mass breakdown leading to potential reductions in weight.

He outlined the way in which the small robot company had worked with other specialist companies when considering chassis development, ride testing as well as ride modelling and stabilisation. Without such cooperation he felt development would have been challenging and taken much longer. Questions flowed thick and fast concerning all aspects of robot development and ways in which the company saw the applications of these new concepts.
This meeting was recorded and will be available on the IAgrE website.

Wrekin Branch

AD plant management and feedstocks

Report by Bill Basford

Will Tuer spoke via Zoom to the branch on AD plant management and feedstocks. This presentation was held on Zoom due to recent changes in Covid restrictions.

Will first described the background to his developing career which led him from Newton Rigg via Harper Adams University through John Deere. Whilst at JD he became interested in AD plants running in Europe and this led him now to his own company focussed on AD management and consultancy. In addition, he has set up marketing of AD output products to developing markets.

He outlined the processes involved with AD plants and the vital management necessary. It quickly became obvious to all watching that there is considerable expertise demanded in the management of such projects. In describing various systems he had been involved with, he emphasised the significance of managing feedstocks into various systems. Indeed the quality and preparation of the feedstocks he confirmed was absolutely critical to the stable performance and output of any AD plant.
Particular attention was vital in all stages of hydrolysis, acidogenic, actinogenic and Methanogenic cycles within operation.
He suggested that benchmarking between plants for comparisons was now critical to ensure that AD plants were achieving their best performance. He described the biogas in its constituent forms and the variations which can occur. Suggesting that 50% of the current AD plants now operating in UK were installed within the Feed In Tariff financial support system, he indicated that now these were generally old technology units, not too many recent new technology installations had been put in.

Questions followed quickly: on how managers of such plants can be

Will Tuer - AD Plant

SS Great Britain

trained and qualified, how hikes in fertiliser costs may affect AD plant constituent's intake and output 'sales', whether the biogas can be cleaned effectively enough for some of the newer engine plant, whether AD operation clashes within grassland herd management if zero grazing not practiced etc, etc. So, if you want to know more, this meeting's recording will provide an excellent resource.

Wrekin Branch

Conservation of metalwork

Technical presentation

Report by Dave Clare

On the evening of 18th January, the Wrekin Branch were given an informative presentation by Robert Turner on the conservation of metalwork. Robert founded Eura Conservation Limited, a company specialising in the conservation of architectural metalwork, structures and artefacts, particularly large ones. His company also took on the conservation of non-metal items such as tile panels. During his career he has developed new techniques and novel approaches to conservation.

Robert started by outlining some of the principles of conservation, the overriding principal being any actions should be non-invasive and reversable if possible. He then went through several examples explaining the challenges and techniques used.

One particular challenge was the removal and conservation of several Doulton tile panels that needed removing and then conserving from a hospital that was being knocked down. The traditional method of removal was to carefully saw the grout out and then use a low-pressure pneumatic drill and leaver them off the wall. This could result in losses as high as 50%. Robert developed a new method using a Diamond wire saw to cut the tiles from the wall as a whole panel. Some of the panels are now on display in the new hospital.

Depending on the function of a structure, the approach taken to conserving it may be different. Robert illustrated this with a comparison between the SS Great Britain, its function being a museum piece, and Fort Brockhurst bridge which still needed to function as a bridge.

The Challenge with SS Great Britain was she had spent many years in salt water. After researching possible treatments, the required solution would be to house her in a dehumidified environment, but her sheer size precluded that. Robert's solution was to install a glass 'ceiling' in the dry dock at what would have been waterline and only dehumidify the lower half of the hull. With Fort Brockhurst bridge, the structure had to be fully dismantled and inspected. Parts which structural engineers deemed no longer strong enough had to be remanufactured before the bridge was reassembled.

Watch again

All the recent Wrekin Branch presentations are available on the IAgrE's YouTube channel:

https://bit.ly/3p3ubZy

YouTube

Membership Changes

1/11/21-31/01/22

Admissions

Fellow

Member

Ms Vimbai Pachawo (Portugal)

Associate Member

Associate

Affiliate

Mr Peter Alexander (Northern Ireland)

Technician

Mr David Kirschner (S Western)
Mr Sam Gatley (W Midlands)
Mr Cameron Merryfield (S Western)
Mr Peter Vooght (S Western)
Mr Simon Laws (S Western)
Mr Luke Cross (S Western)
Mr Luke Bodley (S Western)
Mr Richard Beer (S Western)
Mr Josh Machin (Wrekin)

Students

Coleg Cambria Llysfasi

Charlie Justice
Arwel Williams
Aled John
Ryan Heym
Jack Hood
Edward Davis
Huw Morris
Iwan Whitley
Daniel Smith
Noah Woodhouse
Jack Bevan
Henry James
Kyle Brown
Oliver Honeywood
Jack Felton
Josh Harrison
Keaton Deans
Gwyn Williams
Ethan Schuurman-Smith
Charlie Booth
Ellis Rosie
Billy MacLean
Kameron Laughton
Robert Breck
Ashley Roberts
Milan Clifton
Rowan Jones
Alfie Gibbs
Richard Smith
Charlie Roberts

Harper Adams University

Declan Parker
Elliot Lack
Ferdie Brooks
William Manfield-Yorke
Alex Wright
Jacob Morrison
Rory McElhinney
Jack Atherton
Alfie Barber
Sam Balfour
Elian Evans
Bedwyr Davies
Martin Darley
Thomas Mills
Nathan North
Benjamin Wilson
Matthew Wardell
Eric Murray
Joe Prendergast
Jacob Bullock
Christian D'Angelo
Edward Esden
Archie Bush
Luke Jervis
Alexander Fuller-Shapcott
Frederick Hewis
George Berry
Jamies Davies
Owen Davies
Joshua Baker
Dewi Davies
Natasha Brazier
Robert Johns
Dom Roberts
George Wigley
Oliver White
Fraser Ross
Finnbhar Wylie
Jason Roberts
Dean Cohen
Jack Hughson

University of Reading

Adam Peter

University of Lincoln

Samuel Carter
Nikolaos Tsagkopoulos
Emlyn Williams

Reaseheath College

Anna Welland

Lackham College

Russell Hooper
Rhys Bolter
Charlotte Davis
James Bellamy
Charles Richards
Alex Hedges
George Gregory
Daniel Haggaty
Joe Oatley
Joseph Witchell

Lutterworth High School

Samuel Deacon

Re-admission

Member

Deaths

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

Dr Massoud Shaker FIAgrE.
A member of the Institution for over 30 years. He joined as a Member in 1988 and moved to Fellow grade in 1991.

Transfers

Fellow

Member

Mr Sam Scales (Wrekin)

Associate Member

Mr Huw Gilchrist (Western)
Mr John Nixon (Wrekin)
Mr Joe Foreman (East Midlands

SOCIETY FOR THE ENVIRONMENT

CEnv

Long Service Certificates

	Name	Grade	Date of Anniversary
60years	Geoffrey James Shaw	MIAgrE	9 Jan 2022
	John Philip James Munson	FIAgrE	27 Mar 2022
50years	Malcolm George Cluett	AMIAgrE	26 Jan 2022
	Brian Gilbert Sims	MIAgrE	26 Jan 2022
	Hugh Lempriere Back	MIAgrE	26 Jan 2022
	John Skidmore Cooke	MIAgrE	26 Jan 2022
	Andrew John Landers	FIAgrE	26 Jan 2022
	James Anthony Sweetman	MIAgrE	26 Jan 2022
	Robert Michael Voss	MIAgrE	26 Jan 2022
	Hugh John McIlvenna	MIAgrE	10 Mar 2022
35years	Simon Matthew Barber Shaw	AIAgrE	26 Jan 2022
	Stephen James Penny	MIAgrE	05 Feb 2022
	David John Purdy	MIAgrE	18 Feb 2022
	Timothy Charles Fry	AMIAgrE	27 Mar 2022
25years	Ian Matthew Fenton	AMIAgrE	7 Jan 2022
	Simon Peter King	MIAgrE	9 Jan 2022
	Christopher Saunders	AMIAgrE	21 Jan 2022
	Darren Bentley	MIAgrE	31 Jan 2022
	James Oliver Williams	AIAgrE	31 Jan 2022
	Mohsen Shamsi	AMIAgrE	31 Jan 2022
	David Price	FIAgrE	4 Feb 2022
	Hugh Gordon Crabtree	FIAgrE	25 Feb 2022
	Nicholas William Thomas Parry	AMIAgrE	3 Mar 2022

Academic members

Berkshire College of Agriculture
Hall Place, Burchetts Green, Maidenhead, Berks, SL6 6QR

Bishop Burton College
York Road, Bishop Burton, Beverley, HU17 8QG

Brooksby Melton College
Asfordby Road, Melton Mowbray, Leics, LE13 0HJ

Coleg Cambria – Llysfasi
Rhuthin, Sir Ddinbych, LL15 2LB

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

Harper Adams University
Newport, Shropshire, TF10 8NB

Hartpury College and University
Gloucester, GL19 3BE

Institute of Technology
Tralee Clash, Tralee, Co Kerry, Ireland

Lincoln Institute of Agri-Food
Technology, Lincoln University, Lincoln, LN6 7TS

Manchester University
School of Electrical and Electronic Engineering, C39, Sackville Street Building, Sackville Street, Manchester, M1 3WE

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

Suffolk New College
Suffolk Rural Campus, Charity Lane, Otley, Suffolk, IP6 9EY

University of Manitoba
Winnipeg, Canada, MB R3T 2N2

Warwickshire College Group
Warwick New Road, Leamington Spa, CV32 5JE

Wiltshire College Lackham
Lacock, Chippenham, Wiltshire, SN15 2NY

Commercial Members

Ace Aquatec Ltd
16B City Quay, Camperdown Street, Dundee, DD1 3JA

Agri-EPI Centre
1-4 Bush House Cottages, Edinburgh, Technopole, EH26 0BA

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

Amazone Ltd
Orchard Farm, Hurst Lane, Aukley, Doncaster, South Yorks, DN9 3NW

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

BAGMA
225 Bristol Road, Birmingham, B5 7UB

Briggs Irrigation
Boyle Road, Corby, Northants, NN17 5XU

City and Guilds
1 Giltspur Street, London, EC1A 9DD

City Farm Systems Ltd
25 Hepplewhite Close, High Wycombe, Bucks, HP13 6BZ

Claas UK Ltd
Saxham, Bury St Edmonds, Suffolk, IP28 6QZ

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

DeLacey Executive
Suite 7, Malvern Gate, Bromwich Road, Worcester, WR2 4BN

Douglas Bomford Trust
The Bullock Building, University Way, Cranfield, Bedford, MK34 0GH

DSL Systems
Adbolton Hall, Adbolton Lane, West Bridgford, Nottingham, NG2 5AS

Fullwood
Grange Road, Ellesmere, Cheshire, SY12 9DF

Household Sprayers
Roughton Moor, Woodhall Spa, Lincs, LN10 6YQ

HSS Hire
25 Willow Lane, Mitcham, London, CR4 4TS

JCB
Rocester, Staffs, ST14 5JR

John Deere Ltd
Harby Road, Langar, Nottinghamshire, NG13 9HT

Knight Farm Machinery
Wireless Hill Industrial Estate, South Luffenham, Rutland, Leicestershire, LE15 8NF

Magna Specialist Confectioners Ltd
Magna House, Stafford Park 3, Telford, Shropshire, TF3 3BH

Marks & Clerk LLP
90 Long Acre, London, WC2E 9RA

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

National Fluid Power Centre
Carlton Road, Worksop, Notts, S81 7HP

NFU Energy Services
Stoneleigh Park, Kenilworth, Warwickshire, CV8 2LS

Nick Young Tractor Parts
Unit 2, The Forge, Moor Road, North Owersby, Market Rasen, Lincolnshire, LN8 3PR

Orby Engineering
Craigmore Road, Newry, BT35 6JR

PlantTech Research Institute
Bay of Plenty, New Zealand

Reesink Turfcare UK
1-3 Station Road, St Neots, Huntingdon, PE19 1QH

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

Spaldings Limited
25-35 Sadler Road, Lincoln, Lincolnshire, LN6 3XJ

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

Teagle Ltd
Blackwater,Truro, Cornwall, TR4 8HQ

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

Witham Oil and Paint Ltd
Outer Circle Road, Lincoln, LN10 6YQ

Opinion:

Commercialisation of new developments

Most current developments in Agricultural Engineering are concerned with introducing autonomous machines and related precision farming systems. While these certainly look like an important part of the future, how will the introduction to the commercial market be handled? IAgrE member Alastair Tulloch gives his view.

These developments are more likely to be part of a very competitive market, with everyone looking for a convincing argument to sell their proposals. The winners could well be those with a fully joined-up and pragmatic proposition, which delivers what the customer really needs, rather than what some might think is needed.

Cautious steps to market

Experience shows that any new product or system needs to have a sound validation process, which is of equal importance to the original development. This should include a period in a simulated commercial operation, as this will reveal new issues not seen during the R&D

Commercial operators will not be so sympathetic to the software systems and expect something close to 'plug and play' from the start.

phase. Commercial operators will not be so sympathetic to the software systems and expect something close to 'plug and play' from the start. Those in product support functions will be familiar with the statement of "well, it should work!" How many of us have heard that in relation to software with modern communication devices, for example?

So, who in the market will take on a new idea? There will always be a few enthusiastic commercial customers, who will be prepared to try something new, since they share many of the same ideas as those who developed the systems. However, these tend to be few , and the majority will prefer to wait to see how their neighbour gets on first. Of those who do try, their tolerance will allow one or two attempted solutions for any problems which arise, but not much more! They are likely to be short on time, have limited patience and be more concerned with their own business programmes, on which success of new ideas may well depend.

People are key

New products and systems which are anticipated to be delivered in volume, need a sound distribution strategy with appropriate product support and that brings up other questions. Who will these 'sales partners' be? How enthusiastic will they be in practice? And what commercial expectations will they have to earn a margin from such a venture? What training will be offered and what calibre of people are required? Where will they come from?

Such questions probably slowed the introduction of some potentially good precision farming and GPS-orientated ideas in the early days, when relatively small producers tried to launch new systems to an interested, but slightly sceptical market. 'Plug and play' was clearly required, but not always delivered in spite of good efforts and best intentions. Software compatibility was also an issue in trying to connect with other machines and systems. 'Well, it should work' comes to mind again.

Solutions not products?

One idea which could be a catalyst to aid the development and introduction of new systems, may be marketing a 'business solution' rather than simply a 'product'. These proposals are not new, and have been a part of a number of other industries for some time. In agriculture, they have become more prevalent over the past 20 years for 'big ticket' machines, particularly with 'agri-business' type ventures. These customers are looking for a cost per hectare, or cost per hour, solution with a bespoke finance package to fit their business cash flow and are not particularly interested in a 'list price' or an array of options. Fixed costs are the key, particularly if a service and maintenance contract is included. These businesses want to work with a known cost and some security as part of the operating process.

Opinion:

Uptime guaranteed

If autonomous or semi-autonomous machines are to be the next big agricultural revolution, which seems very likely, be they big or small, simple or complex, there will be an overriding requirement for guaranteed up-time, durability and reliability. If a supplier could offer this type of benefit, to dovetail with autonomous benefits, then it is likely to attract interest from those who are desperately trying to save costs. Selling a business solution, with some guarantees, requires a courageous approach with sound support systems, but then a wise man once said that 'fortune favours the brave'.

The times, they are a changin'

Agriculture is surely entering a difficult time, with a number of new and different requirements to be met. This is likely to lead to tighter margins from increased input costs and a rather uncertain short-term future. This is bound to create caution over future investments due to the lack of confidence it tends to create. A new idea, which proposes to address these issues, needs to be proven in practice, not only advised in theory, when offered to a rather sceptical market. Those who can offer some tangible advantages for a new system may well be the ones who win.

Tighter margins in agriculture may well help achieve change from those who wish to continue in the industry, and open the door for enthusiastic youngsters prepared to have a go.

Such changes will undoubtedly help, but one effect observed in recent times is that these new enterprises are also likely to be larger units, due to more consolidation. Sadly, for many this may change the profile of traditional family farms and the long-established rural economy. Perhaps this may induce a change in the marketing approach for new ideas, to a more business-like package.

Those who can offer some tangible advantages for a new system may well be the ones who win.

About Alastair Tulloch

Alastair graduated from college with two engineering diplomas at the end of the 1960's, which is when he joined IAgrE.

He worked for all of his career with Claas UK Ltd. Starting in 1972 as a Demonstrator and Training Instructor. He gradually progressed to acquire all the 'after-sales' responsibilities and became a Director in 2000.

Since retiring in 2017, he retains a continued interest in the industry and has an involvement with the Claas International Scholarship Scheme and the LAMMA Innovations Awards. He has also written articles for industry publications.

Profession:

Cranfield University academic to work with Welsh Government on soils policy

Cranfield University academic Dr Jacqueline Hannam is to work with the Welsh Government to develop the first Soil Policy Statement for Wales.

Dr Hannam, President Elect of the British Society of Soil Science and Senior Lecturer in Pedology in the University's Soil Informatics group, will spend 12 months on part-time secondment to the Soil Policy & Agricultural Land Use Planning Unit at the Department for Climate Change.

Together, they will conduct an evidence review to better understand the current condition of soils in Wales, as well as future challenges facing Welsh soils managed under agriculture within the context of biodiversity loss and climate change. This information will then be used to set out the principles for the country's sustainable use of soils in the future.

Dr Hannam said: "Soil is essential for life but is a finite and fragile resource that requires careful, sustainable management.

"I am very much looking forward to working with the Welsh Government on this crucial soil policy statement to develop the evidence base, policy framework and national minimum standards that will help to maintain this important resource for future generations."

The soils policy statement will sit within existing and forthcoming Welsh Government policy frameworks as well as relevant external EU and global soil policies. It will align with the forthcoming Agriculture Bill and proposed new Sustainable Farming Scheme, and will therefore focus on agricultural soil as a major controllable factor influencing soil condition.

As tree planting displaces agriculture, they will discuss concerns about food sovereignty and the viability of rural communities.

Rooting out the pros and cons of rewilding

Concerns about so-called 'green lairds' buying up agricultural land for carbon sequestration will be discussed at an event led by SRUC.

The roundtable event will bring together key stakeholders from across the UK to identify, research and discuss the opportunities and risks arising from large-scale land acquisition for tree planting.

As tree planting displaces agriculture, they will discuss concerns about food sovereignty and the viability of rural communities.

However, they will also look at the benefits of private investment which could help meet net zero and other nature-related targets over the next ten years – as well as increase land values for owner-occupier farmers.

Researchers from the Scottish Environment, Food and Agriculture Research Institutes (SEFARI) and the University of the Highlands and Islands have invited people from all sides of the debate – including representatives from the UK and devolved governments, investors, landowners, and community groups to join a Special Advisory Group. The project is looking at changes in land use within existing holdings as well as land use change arising from acquisition programmes.

It is focusing on green investment funds seeking to rewild agricultural land of any type, typically with native woodlands - often described as 'land sparing' because land is set aside for nature - and comparing these with land sharing approaches, such as those based on peatland and farm soil carbon markets.

Funded by the Scottish Government, the project is chaired by Mark Reed, Professor of Rural Entrepreneurship and Director of the Thriving Natural Capital Challenge Centre at SRUC.

Profession:

Using crops to produce the raw materials for industry could reduce our reliance on petrochemicals

Scientists developing crop that replaces fossil fuels as source of key industrial compounds

Modified plants can produce chemicals used by makers of food, cosmetics, and electronics

Rothamsted scientists have engineered a plant to produce a range of vital chemicals used in the manufacture of common everyday items, the majority of which are usually obtained from fossil fuels.

The class of chemicals – a group of molecules called 4-VPs (vinyl phenols) - are widely used in the manufacture of products such as food and make up – and even includes a plastic used in television and mobile phone screens.

The breakthrough came when researchers altered a metabolic pathway in the oilseed plant camelina and diverted it to make derivatives of these potentially useful products instead.
This is the first time this has been achieved in plants, and the crop has already been tested successfully in the field – a vital step in producing the volume of chemicals needed by manufacturers.

Using crops to produce the raw materials for industry could reduce our reliance on petrochemicals, which would help the move to net zero, says the study's lead author, Dr Guillaume Menard.

"It's amazing just how many everyday products are made from, or contain, chemicals extracted from crude oil and its derivatives. We all know the issues around the continued extraction and use of fossil fuels, but turning camelina plants into 'green factories' to make substitutes for these petrochemical compounds is a great sustainable alternative."

Camelina is an emerging oilseed crop that is increasingly being used to produce a range of speciality food and non-food products in Europe and North America.

Professor Rob Edwards, Head of the School of Natural and Environmental Sciences at Newcastle University

Agricultural universities team up on research plan

More than a dozen universities, which offer courses in agriculture and carry out agricultural research, are getting together to agree on joint agricultural research priorities, working with farmers and others who have a stake in the industry's future.

With farming in the UK currently going through a rapid transition, the initiative responds to calls for more joined-up research and to ensure public investment in agricultural innovation makes a difference on the ground.

Sixteen universities recently came together to form the Agricultural Universities Council (AUC) which will engage with all four Governments in the UK in its ongoing work. The Council's first project will be to map existing agricultural research capacity across the UK for the first time in a decade, and work with farmers, as well as environmental, welfare and community groups, food businesses, and other stakeholders, to shape future research priorities.

This new research initiative was announced on 27 January by Defra Secretary of State The Rt Hon George Eustice MP who will speak at the launch of the UK Agriculture Partnership taking place at the Royal Agricultural University, which is one of the members of the AUC.

Professor Rob Edwards, Head of the School of Natural and Environmental Sciences at Newcastle University, who chairs the AUC, said: "We already have a wealth of expertise and facilities for agricultural education and research across the UK but we can make even more of it, with more benefit for farming and the public, if we coordinate our efforts.

"That's why this group of universities, from across the four nations of the UK, has decided to work together as the Agricultural Universities Council. Universities, like all sectors, are faced with a whole range of competing demands and pressures and I've been heartened by the huge goodwill and commitment our members have brought to working together."

Professional:

The Douglas Bomford Trust

50 years young

The Douglas Bomford Trust's Secretary Alan Plom looks back over the past few months and looks forward to the Trust's 50th Anniversary:

Golden Jubilee

Throughout 2022, we will be reflecting on achievements over the past five decades since the Trust was set up in memory of Douglas Bomford. Our focal point will be an event on 7 September at the Springhill Conference and Function Centre, at Pershore in Worcestershire, kindly provided by Jonathan Bomford, the Bomford family's representative on the Board. Numbers are limited and personal invitations will be sent out shortly, mainly to those who we have worked with and sponsored. This event will be used to highlight some achievements and wider impact as well as looking to the future. If you would like to share how the Trust helped you, please send your written 'testimonial' or ideally, a short video 'selfie', to;

Throughout 2022, we will be reflecting on achievements over the past five decades since the Trust was set up in memory of Douglas Bomford.

enquiries@dbt.org.uk asap, so that we can collate these to show during the event. Watch this space and follow **@BomfordTrust** on Twitter and LinkedIn for further announcements.

New Outlook - We will also be announcing our new strategy to identify and allocate funds to projects on 'priority' topics. This is being developed from our ongoing 'horizon scanning' project, initiated three years ago by a group of MSc students working together at Cranfield University.

New Input - We welcomed two new Trustees to the Board at our (virtual) AGM in November, but all Trustees should be able to meet face-to-face for the first time in more than 2½ years on 5 April 2022. This is being held at the Lincoln Institute of AgriFood Technology (LIAT), 'home' of one of our new Trustees, Professor Simon Pearson.

New Projects - The Board meeting will be considering the latest applications for financial support for projects (over £5,000) but this will also be an opportunity for our Trustees to see LIAT's cutting edge Agri-Robotics research centre and also meet some students and staff involved in this work.

Professional:

The Douglas Bomford Trust

Professor Simon Pearson

Simon is director of the Lincoln Institute for Agri-Food Technology (LIAT). He is the son of a South Lincolnshire farmer and was CEO of a large UK farming company. He previously worked for Marks and Spencer plc in a technical role, and as a scientist at the University of Reading.

Simon's academic role involves developing and running cross-disciplinary research projects, with a large focus on the use and deployment of agri-food robotic systems, including robotic crop harvesting and food processing systems, use of autonomous and electric vehicles in the agri-food sector, and the application of actuators within agri-food robotic systems.

His diverse research interests extend to applications of AI, machine learning and robotics in agriculture, the role and development of digital technologies in the agri-food system and whole system approaches to sustainable farm production. All these sit squarely within the Trust's broad scope, so Simon's perspectives will be invaluable.

New Trustees

Rebecca Geraghty

Rebecca brings to the Board a broad understanding of the industry as well as knowledge of the fast developing field of data capture and analysis, critical to enable environmental, technical and financial data to drive development and transformation within businesses.

Rebecca joined Agrimetrics executive management team as Chief Commercial Officer last year, after 20 years at the Agriculture and Horticulture Development Board (AHDB), formerly the Home-Grown Cereals Authority (HGCA). As the AHDB's Chief Technical Officer she led its research and knowledge exchange teams, and technical products and services across the six agri-food sectors. She was previously Sector Director for Cereals and Oilseeds. She also lives on a small beef farm, which helps give her a practical and economic perspective too.

In her current role, Rebecca is responsible for ensuring Agrimetrics* products are ' customer-centric and value-creating'. The goal 'to help create a more sustainable and resilient agri-food sector, powered by data by enabling next-generation solutions as quickly and affordably as possible', also aligns with that of the Trust.

**Agrimetrics is one of four centres for agricultural innovation, founded with an initial investment from Innovate UK, along withv partners NIAB, SRUC, Rothamsted and The University of Reading.*

Agri-Food Charities Partnership (AFCP) Forum

Several of our Trustees attended the AFCP's* National Forum (and AGM) held at Hartpury University near Gloucester in November. It was a great opportunity to meet some of our sponsored students for the first time face-to-face. We also enjoyed a brief tour of the livestock technology research facilities at Hartpury.

**Check out the other 65 charities listed on AFCP's website:*

www.afcp.org.uk for alternative sources of funding.

Credit: The AgriFood Charities Partnership

The Douglas Bomford Trust

For further information see our website

www.dbt.org.uk

or contact the Trust via

enquiries@dbt.org.uk

or phone

07951 527051

STOP PRESS - Celebrating Success:

We are pleased to report that Silvia Arpano, a final year PhD student at Cranfield (co-sponsored and mentored by the Trust), won the IAgrE South East Midlands Branch annual Student Presentation Competition on 8 February, for her engaging and factually well-presented short lecture on 'Optimizing Polyacrylamide (PAM) spray application to mitigate soil splash and capping'.

NOTICE OF MEETING

Notice is hereby given that the Seventy-sixth Annual General Meeting of the Institution will be held on Wednesday 27th April 2022 at 11am at CLAAS UK Ltd, Saxham, Bury St Edmonds, Suffolk IP28 6QZ

Agenda

1. To receive and consider the minutes of the seventy-fourth and seventy-fifth AGMs held on 27th April 2021
2. To propose as an Ordinary Resolution: "That the Annual General Meeting authorises the Trustees of the Institution to review members' subscriptions and to make such adjustment, if any, as may be required with effect from 1st January 2023".
3. To receive and consider the Annual Report for the year ending 31st December 2021.
4. To receive and consider the Accounts for the year ending 31st December 2021.
5. To announce nominations for election to Council for the 2022/23 Session.
6. To re-appoint Landers Accountants Ltd, registered auditors, as reporting accountants and to authorise the Executive to fix their remuneration

By Order of the Trustees

Charles Nicklin, Chief Executive and Secretary
10th February 2022

NB: ALL PAPERS ARE AVAILABLE ON THE IAGRE WEBSITE

IAgrE

ENTER THE LE-TEC **LAND-BASED ENGINEERING TECHNICIAN OF THE YEAR COMPETITION!**

We're looking for our next champion technicians to be the voice of Land-based Engineering for 2022!

With two categories this year, one for someone who just embarking on their career and one for someone who has made a successful career and seen their vocation develop. A host of exciting prizes are up for grabs!

Whether you're an apprentice technician just starting out, or a master technician with years of experience under your belt, we want to hear from you!

Simply record a short video telling us:
- who you are and what you do,
- how you got into this industry,
- what makes it so rewarding, and why others should consider it as a career.

Don't worry if it's a selfie style video, or a blockbuster production, it's your story we want to hear it and that's what could win you the prize!

For more information and example videos from previous years, head over to landbasedengineering.com. Then submit your video to info@letec.co.uk.

Entries close 28th March 2022

A selection of great prizes are on offer including:

- Multi-day Training Courses provided by AP Air Ltd including Accommodation and Meals for two winners!

AP AIR EUROPE
Conditioned to provide quality parts

- A Makita MR007GZ Radio donated by Makita UK

makita

- More training and tools based prizes to be announced in the coming weeks!

MERLO

- BAGMA Handover and Installation Training, including Accommodation and Meals for two winners, donated by Merlo UK Ltd