IES News Bulletin
May 2025
The Institution of Engineers in Scotland A Multi-disciplinary Engineering Institution

Welcome to our Spring Bulletin

We have just held our AGM and I am pleased to welcome our new members of Council

- Donald Lawson
- Dr Martin Macdonald

And for their second term in office

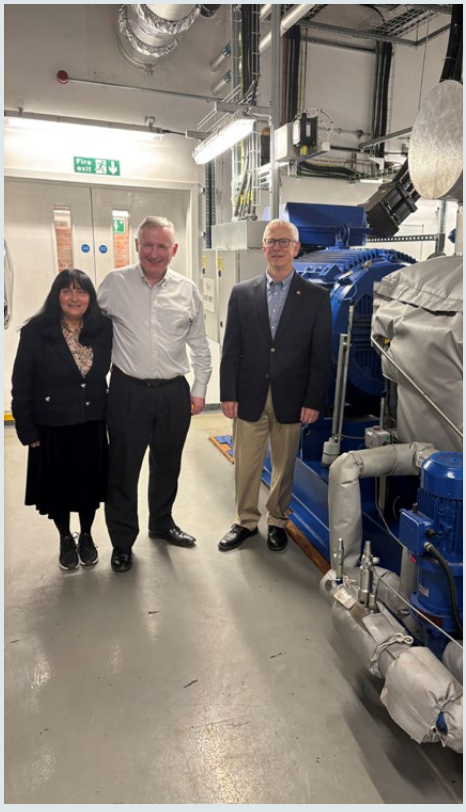
- Prof Erkan Oterkus
- Dr Carol Marsh
- Jemma Quin

Since our last bulletin we have been firming up plans for next year's programme.

Full details will be announced soon but I can reveal a few of the topics… Hang glider – history of flying in Scotland over 100 years, Hydrogen as a fuel, Cybersecurity and Carnot batteries – energy storage!

IES Hosts ASHRAE President

IES President Graeme Fletcher welcomed the ASHRAE President, Dennis Knight, and a group of young engineers from the Chartered Institute of Building Services Engineers to the East Dunbartonshire Energy Centre at Queens Quay, home to the UK's largest river source district heating system. The industrial heat pump was installed by Star Refrigeration in 2020 and can provide up to 5.2MW of heat to homes and commercial properties in the neighbourhood. President Knight delivered a talk on the global need for decarbonisation and our past President, Andy Pearson, reprised his IESIS Presidential address from 2020 which covered Scotland's role in the development of heat pumps from 1850 to 2050. This was followed by a lively question and answer session and a tour of the facility.



Primary Engineer

The IES has been a long supporter of Primary Engineer, a UK-based educational not-for-profit, who, since 2005, have been on a mission to bridge the gap between education and industry. They do this by bringing engineering to life in classrooms across the UK with our range of fully-funded educational programmes, competitions, and qualifications. These activities are designed to engage both teachers and pupils in significant ways by creating meaningful connections between engineering principles and real-world applications.

A huge part of their work is creating role models for pupils through engineer engagement. The role volunteer engineering and technology professionals play in inspiring, nurturing and developing the next generation cannot be underestimated. Young people cannot aspire to something they didn't know existed, so bringing engineers into the classroom to work alongside teachers and pupils is a major part of Primary Engineer's work.

One of Primary Engineer's flagship initiatives which has a variety of flexible engagement opportunities is their annual Leaders Award competition. This competition is open to pupils aged 3-19 across the UK and ask the question, "If you were an engineer, what would you do?". The competition encourages pupils to interview real engineers, fostering connections and sparking curiosity. The involvement of engineers helps Primary Engineer showcase the variety of engineering careers and opportunities, making the field come alive for a broader audience.

Pupils then use these interviews to identify innovative solutions to real-world problems, building communication and writing skills through an annotated illustration and crafting a persuasive letter that explains their ideas. Pupils build lasting memories at regional public exhibitions and awards ceremonies where their incredible, innovative ideas are celebrated in the summer term.

They have been able to measure the substantial impact of their contributions, proving that their approach is much more than just a fleeting moment – it's about creating lasting memories, developing skills and opening doors to their future careers and interests.

Here's what a few volunteers and pupils said:

"This was my first Volunteering experience. It was fantastic, one of the funniest and most thought-provoking days ever. Some of the kids suggestions were hilarious, some sad, some sweet and even a few dark ones. There was a lot of thought and a lot of love gone into many of those suggestions. Instructors were great, supportive and helpful, thoroughly enjoyable day" – **Ian, from Thales UK**.

"It was such a fun experience that really makes you take a step back from your day to day work. I've been thoroughly inspired by the ideas pupils have come up with and loved the creativity. They quite often tugged at my heartstrings which made it so much harder to grade. It was so refreshing to transport into the minds of these pupils for a day. Definitely would do again next year, a really cool competition. My favourite designs were those that the stroke stopper and sign language translator" – **Panxin, from Rolls Royce SMR**

IES members can be part of the story by registering for more information: https://leadersaward.com/join-us/

Groups IO

We have more people join the group, please join in or start a new discussion

https://groups.io/g/IESConversations

Visits

We will be in touch soon with details of visits which will be held in the second quarter of the year.

international ORKNEY SCIENCE FESTIVAL

We are very pleased to support this year's Orkney International Science Festival. This year will be the first Prof Iain MacLeod Memorial Lecture. Iain had spoken at the festival several times and thought very highly of it.

IES Council Member Jemma Quin has offered to deliver the first Iain MacLeod Memorial Lecture, visit schools and take part in 'family day' with some engineering challenges for youngsters.

https://oisf.org/

FemEng Botswana 2025

The FemEng in Botswana Team 2025 visiting sponsor Woolgar Hunter in Feb 2025
Lily, Emma, Cleopatra, Vivienne, Kiera, Alžbeta, Sadie and Rachel

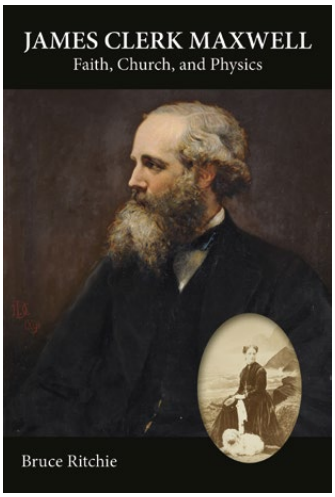
Over the last few months we have been busy creating and testing workshops. The goal of the workshops are to teach basic engineering concepts related to an engaging hands-on activity. The workshops are based on mechanical, civil, biomedical, electrical, aeronautical and product design engineering. The workshops we have developed so far include:

- Earthquake simulation building design
- Balloon cars
- Pinwheel turbines
- Build your own stethoscope
- Ping pong ball run
- Engineering for a life on Mars
- Paper loudspeaker
- Copper tape circuits

Each workshop follows the same structure, starting with a learning objective, engineering, instructions and then engineering conclusions.

Book review – Dr Andy Pearson

James Clerk Maxwell: Faith, Church and Physics, by Dr Bruce Ritchie

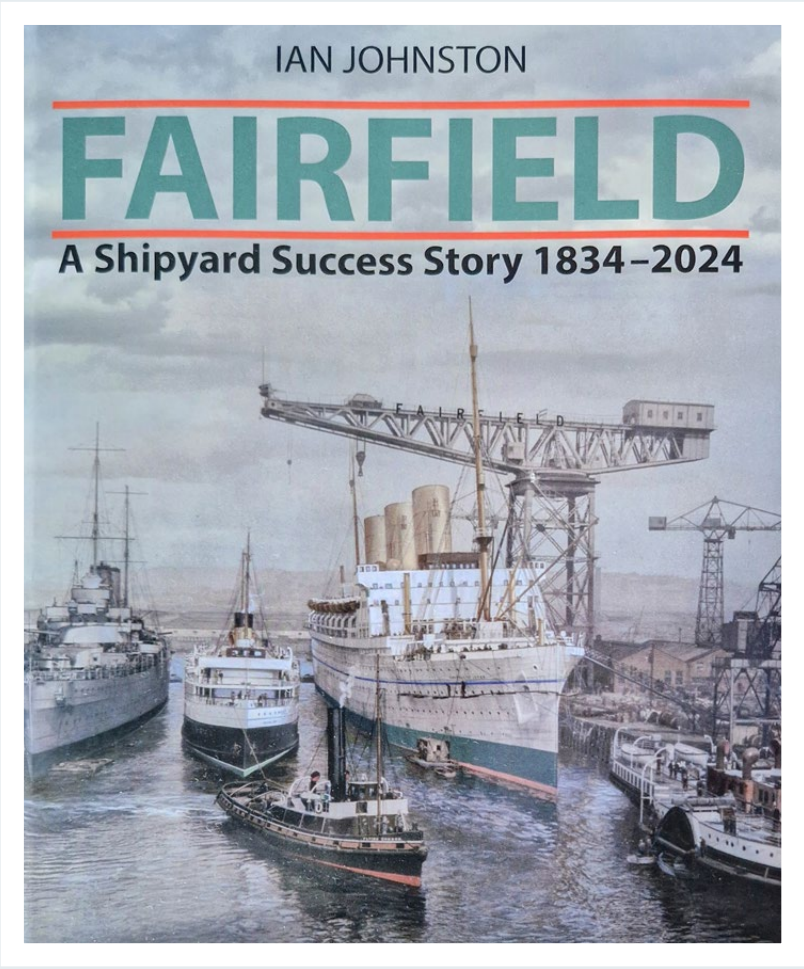


Clerk Maxwell is perhaps the most famous scientist that the general public have never heard of. His work in field theory, electromagnetism and thermodynamics laid the foundations for most of the technology upon which our lives now depend, but it has been said that Maxwell's equations were dismissed in his lifetime because they had no application. They had to wait 40 years until Einstein published the theory of general relativity to find their purpose and Einstein credited Maxwell as his greatest influence and inspiration. It is also a commonly held belief that the blossoming of science in the 19th Century marked the beginning of the end of belief in a creator God, at least among intellectuals and academics and especially scientists. It may therefore be a surprise to learn that Clerk Maxwell, who took scientific thought further in his short life than anyone had before him, had a strong and dynamic rational Christian faith which remained a constant source of inspiration for his exploration of the most abstruse physical concepts.

Dr Ritchie is a mathematician who became a Church of Scotland minister for ten years in Galloway, close to Clerk Maxwell's home at Glenlair, then for fourteen years in Crieff. He taught in a theological college in Malawi from 2001 to 2006 before returning to Scotland to serve in a parish church in Dingwall. He is retired from ministry and lectures in Scottish Church History at the Highland Theological College, part of the University of the Highlands and Islands. His biography of James Clerk Maxwell has been called "erudite, crystal clear in explanatory force" and "winsome and warm in tone". It is also described as "a pure delight to read, with brilliant insight in all the hard places". It captures the stories of Scotland in the mid-nineteenth century in a uniquely engaging way and in so doing it addresses deep questions of science and faith that are as relevant and important today as they were to Clerk Maxwell and his contemporaries.

Book Review – Angus Pinkerton

FAIRFIELD: A Shipyard Success Story 1834 – 2024



Ian Johnston, the author of several books about Clyde shipyards and their famous products, has created an all-but encyclopedic history of the shipbuilding site on the south bank of the Clyde near Govan. This yard has had many names over the long history of Clyde marine engineering, but the most celebrated is that of the Fairfield Shipbuilding & Engineering Co Ltd. The shipyard was founded by Randolph Elder & Co, on the land of the Fairfield Farm in 1864. This followed previous incarnations of the company which had begun in 1834 building mill equipment and as a general engineering contractor. The spread of shipyards along the Clyde encouraged diversification into marine engineering, and then direct involvement in shipbuilding. Fairfield was always a centre of innovation, particularly the development of the compound steam engine, which later led to the pinnacle of reciprocating steam, the triple expansion steam engine.

Its pre-eminence as the designers and builders of record-breaking Atlantic liners and machinery for the Guion and Cunard companies set the foundations, and by the late nineteenth century Fairfield had become arguably the most important shipyard and marine engine works in the world. Orders for innovative ship designs and for warships of all classes followed from the British Admiralty and continued through both World Wars.

However, the steady decline of shipbuilding in Britain during the 1950s led to Fairfield declaring insolvency in 1965. Over the next 35 years, much of it under state ownership, the yard suffered name changes and campaigns to keep the yard open, most famously during the Upper Clyde work-in, led by the charismatic shop steward Jimmy Reid in 1971. Under the auspices of British Shipbuilders, ships continued to be built at Fairfield, but with a chaotic set of Government policies and tactics dealing with declining industries, eventually the yard was sold in 1988 to the Norwegian Kvaerner Industries AS. Under Norwegian stewardship, block building was introduced, and productivity at the yard improved significantly, but still lagged behind that of new shipyards in the far east. Eventually, rising losses across the Kvaerner group caused the company to put all of its shipbuilding facilities up for sale.

This might have been the final end for Fairfield, but the consolidation across Britain of military construction of weapons, ships, aircraft and electronic systems led to the formation of BAE Systems in 1999, and finally the yard was again engaged in series production of important ships. This has included Type 45 Destroyers, substantial sections of the two Queen Elizabeth Class Aircraft Carriers, River Class offshore patrol vessels, and Type 26 Global Combat ships. And so shipbuilding continues, now under the cover of the shipbuilding hall that has been constructed on the site of the fitting-out basin adjacent to the yard.

Ian Johnston has collated a vast amount of information about the various phases of development on the site in Govan, and comprehensive lists of the ships designed and launched from Fairfield. It will not only be of interest to those seeking an historical view back to the pinnacle of Clyde shipbuilding, but is right up-to-date with the most recent developments. The 256 pages are illustrated with numerous photographs of the ships, people and facilities that have created what he justifiably calls "a Shipyard Success Story".