



# IES News Bulletin

October 2024

The Institution of Engineers in Scotland A Multi-disciplinary Engineering Institution



Welcome to the first Bulletin of my Presidency. I am deeply honoured and immensely proud to be taking over the reins of this great Institution and look forward to steering it forward to the benefit of all the membership.

We have a wonderful lecture series planned for the forthcoming months ahead and hope you can join us in person at the new venue. All details can be found at the end of this Bulletin. The lectures will be available live online by Zoom for those further afield. This medium has really increased attendance and regularly draw an international and diverse audience. Lectures will also normally be recorded to view on YouTube at some time after the event. However, there is nothing to beat being there in the flesh and I strongly encourage you to attend in person whenever you can. Tea, Coffee and biscuits are supplied.

Thank you to all who have made additional donations with their subscriptions, we are very grateful.

The James Watt Dinner was enjoyed by many on Friday 4 October. Many thanks to the Radisson Blu Glasgow for looking after us so well, and all those that had a hand in the organisation of this prestigious and slick event, particularly our Secretary, Laura Clow. Our after dinner speaker was the highly entertaining and humorous Patrick Draper, who seemed to go down well with most. Our chosen charity this year was Ocean Youth Trust Scotland, who we collected £1913 exclusive of gift aid and some online payments. They were most grateful for our support and their letter of thanks is pictured here.

Please remember to check that your subscription for 2024-2025 has been paid.

Huge thanks to all our members and Company's that supported this year's dinner. Please forward any photographs you may have of the night to Laura.

Ocean Youth Trust Scotland  
Victoria House, Room 16, 5 East Blackhall Street, Greenock, PA15 1HD  
Tel: 01463 232 722  
email: office@oytscotland.org.uk  
web: www.oytscotland.org.uk

Adventure Under Sail  
Inspiring Young People



Graeme Fletcher,  
The Institution of Engineers in Scotland (IES),  
105 West George Street,  
Glasgow, G2 1QL

9<sup>th</sup> October 2024

Dear Mr Graeme Fletcher,

On behalf of everyone at Ocean Youth Trust (OYT) Scotland, I would like to express our sincerest thanks to the Institution of Engineers in Scotland for selecting us as the chosen charity at your 2024 James Watt Dinner. It was an incredible honour to be part of such a prestigious

Thanks to the kindness of those in attendance, we raised an impressive **£1,913**. These funds will make a profound difference to our work, enabling us to continue offering life-changing residential voyages to young people from a diverse range of backgrounds and circumstances across Scotland.

about potential collaborations were both encouraging and inspiring. We sincerely hope to welcome some of your members on-board soon as sailing volunteers, helping us mentor and guide the next generation of young engineers, scientists, and leaders.

On behalf of the more than 600 young people we will support in 2024, thank you for this generosity. Your support will go a long way in empowering young people to reach healthier, happier futures through youth work on the waves.

Fair Winds,

Sian McCluskey

Fundraising and Communications Officer

Partners: Curtis & Batters Aitch Registered Office: 5 East Blackhall Street, Greenock, PA15 1HD Registered No: 103204  
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## Last year's visits

On the back of successful visits last year to Clansman Dynamics, the National Robotarium and the Verdant Works, we hope to arrange Members' visits to at least Whitelees Windfarm and Howdens in the coming months. More details to follow.

# Introducing our Council

## Cuppa & Chat



The Cuppa and Chat sessions will continue to give members a chance to generally discuss topic and content of the previous lecture and any other subject that may come up. Please join these sessions if you have anything to contribute or would like to hear other people's opinions. Details of these and their zoom links can be found below...

All meetings start at 5.30 GMT

Date & Starting Topic	Zoom details
Nov 12, 2024 <b>Steam turbines and sustainability</b>	Join Zoom Meeting <a href="https://us06web.zoom.us/j/89480051120?pwd=aP0A0deIfp0xPAxOCHkKU5DnRqv9IH.1">https://us06web.zoom.us/j/89480051120?pwd=aP0A0deIfp0xPAxOCHkKU5DnRqv9IH.1</a> Meeting ID: 894 8005 1120 Passcode: 540959
Dec 3, 2024 <b>Safety</b>	Join Zoom Meeting <a href="https://us06web.zoom.us/j/84210042280?pwd=TiwWmHqfXkvWUdD0ackm8T9pPIixLj.1">https://us06web.zoom.us/j/84210042280?pwd=TiwWmHqfXkvWUdD0ackm8T9pPIixLj.1</a> Meeting ID: 842 1004 2280 Passcode: 396287
Jan 21, 2025 <b>Wind turbines and offshore renewables</b>	Join Zoom Meeting <a href="https://us06web.zoom.us/j/85881198667?pwd=446yb3t4zFN8DbFMvcIJYRpnfad2nh.1">https://us06web.zoom.us/j/85881198667?pwd=446yb3t4zFN8DbFMvcIJYRpnfad2nh.1</a> Meeting ID: 858 8119 8667 Passcode: 659422
Feb 18, 2025 <b>How covid has affected our buildings</b>	Join Zoom Meeting <a href="https://us06web.zoom.us/j/83291828059?pwd=BxYIPLtSv2KLOWarCbMQt5VakMCXKo.1">https://us06web.zoom.us/j/83291828059?pwd=BxYIPLtSv2KLOWarCbMQt5VakMCXKo.1</a> Meeting ID: 832 9182 8059 Passcode: 618180
Mar 18, 2025 <b>Satellite communications</b>	Join Zoom Meeting <a href="https://us06web.zoom.us/j/84119891009?pwd=CkQtcGa6Ag1HGnvHrOOFFRSc3KhhmT.1">https://us06web.zoom.us/j/84119891009?pwd=CkQtcGa6Ag1HGnvHrOOFFRSc3KhhmT.1</a> Meeting ID: 841 1989 1009 Passcode: 826393

## Executive

### Graeme J Fletcher

Ex Seagoing Marine Engineer, currently Technical Director at Western Ferries (Clyde) Limited.

**President**

### Dr Malcom Robb

Mechanical Engineer, currently Engineering Manager at BAE Systems, Naval Ships Research & Technology Department.

**Vice President**

### David Westmore

Naval Architect, currently Director of Lobnitz Marine Holdings / Seadrec.

**Treasurer**

### Dick Philbrick

Naval Architect and Mechanical Engineer, retired Managing Director and founder of Clansman Dynamics.

**Past President**

### Dr Andy Pearson

Refrigeration Engineer, currently Group managing Director at Star Refrigeration.

**Company Secretary**

## Members of Council

### Ali Ashour

Naval and strategic engineer.

### Prof Erkan Oterkus

Professor at Strathclyde University specialising in computational mechanics of materials and structures in the department of Naval Architecture and Ocean Engineering.

### Maurice Barr

Mechanical Engineer and Entrepreneur, currently Non-exec Director at Star Refrigeration.

### Angus Pinkerton

Ex Aeronautical Engineer turned IT and Information Security specialist. Currently Director of Safety and Training for British Hang Gliding and Paragliding Association.

### Craig Clark

Space engineer and entrepreneur

### Amro Heikal

Industrial expert and scientist, with more than 27 years' experience working in the oil and gas industry.

### Jemma Quin

Chartered Civil Engineer, STEM Ambassador and Author of "The Little Civil Engineer and Friends" books. Currently Temporary Works Manager at Robertson Construction Group and Director of the Temporary Works forum.

### Richard Horrell

Retired Electrical and Mechanical Engineer, ex Royal Navy, specialising in industrial marine engineering systems.

### David McGregor

Business Development Manager Ceed.

### Paul Sweeney

Glasgow University Graduate with experience in shipbuilding and a keen interest in all aspects of engineering heritage. Currently Member of the Scottish Parliament.

### Dr Carol Marsh

Electrical and Electronics Engineer, currently Head of Digital Systems at Celestia UK.

### Ryan Murphy

Environmental Civil and Materials Engineer, currently Technical Director, Evolution Fasteners UK Ltd.

### Prof Zhibin Yu

Currently Professor of Thermal Energy at the James Watt School of Engineering

## Death Notice

It is with great sadness that we learned of the death of our good friend and longstanding member of council, Robert Harley. We will publish a more detailed tribute in time and pass sincere condolences to his family and friends



# Book Review: 'Material World' by Ed Conway

If I was able to write a book that inspired many conversations I'd be a very happy guy. Ed Conway is such a writer with his book *Material World* which we have previously recommended in the Bulletin.

He writes about things that we take for granted. How can chapters on such basics as salt and sand possibly be interesting? They are, because Conway continually manages to unearth surprising facts. He's been down the special Lochaline sand mine, he's been to see the horror of Lithium mining in the Andes foothills.

The Lochaline visit led to an intriguing World War 1 anecdote about how Britain secretly negotiated with Germany, via a Swiss middleman, for the exchange of 22,000 pairs of binoculars for tonnes of natural rubber. Materials are crucial for our well-being, survival and defence.

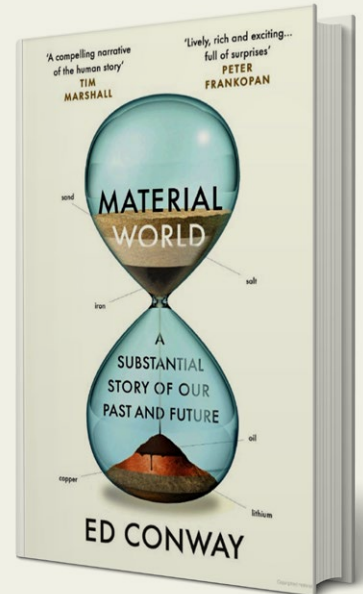
He learns there are numerous grades of sand which is mined more or less without regulation in many countries. Only the very purest and scarce grades may be used for lens, fibre optic and microchip manufacture. Our need for concrete in the built environment of houses, factories, hospitals and bridges can use less pure grades. Sea defences on the west coast of Morocco and in the Mekong delta have been mined away. We wrongly treat the supply of sand as being unlimited, if we think about it at all.

We may know that salt is a biological imperative that has been traded for centuries, but how many consider it is a basic material for much of the chemical and pharmaceutical industries – for baking soda, bleach, hydrogen, chlorine gas, caustic soda – for making paper, soap, detergents, PVC, Valium, anti-biotics, for smelting aluminium, etc.,.

Materials, like religion create conflict, and spur innovation. Chile won a 5 years Pacific War (1879-83) against Peru and their ally Bolivia for the control of nitrates (the 'Gold Rush' for guano) used for explosives and fertiliser. Germany was the biggest importer of those nitrates, which left them exposed to starvation and defeat, after they lost a WW1 naval battle off the Falklands in December 1914. War spurred innovation leading to the Haber-Bosch process bonding nitrogen with hydrogen for artificial fertiliser – without this the war would have ended earlier. There was a parallel in WW2 when Germany tried to make oil and gas from coal for the Luftwaffe who were more or less grounded by 1945. Control of materials can determine outcomes. In the treaty following the Pacific (saltpetre) War Chile gained control of Copper and Lithium deposits.

Steel provides the skeleton of our world, concrete its flesh and Copper its nervous system. Copper is basic to our civilisation. We can flick a light switch. It is vital for electric motors which spurred the industrial revolution and productivity. It sheathed our ships when Britannia ruled the waves before steel. Chile is the largest producer. The smelting process produces clouds of toxic gases, creates a sludge, poisons water supplies, kills fish. Analysis of urine samples shows traces of lead, arsenic and nickel which mine owners say comes from the ground and not smelting! In 1900 50 tonnes of rock produced 1 tonne of copper; it is now 800 to 1; the predictions of a 2.5 increase in the requirement for electrical power generation for net zero 2050 will increase the demand for copper which, in conjunction with poorer deposits, means an increase threat from toxins.

Conway notes that 100 MW of energy generated from wind requires 30,000 Te of steel, 50,000 Te of concrete, 900 Te of plastic and 540 Te of copper plus storage equipment for when the wind does not blow; while a 100 MW electrical energy generated from gas turbines requires just 300 Te of steel, 2,000 Te of concrete and 50 Te of copper. Achievement of net zero will require an increase in consumption of materials because wind and solar are so much less energy dense than oil and gas – we are seldom confronted with these facts.



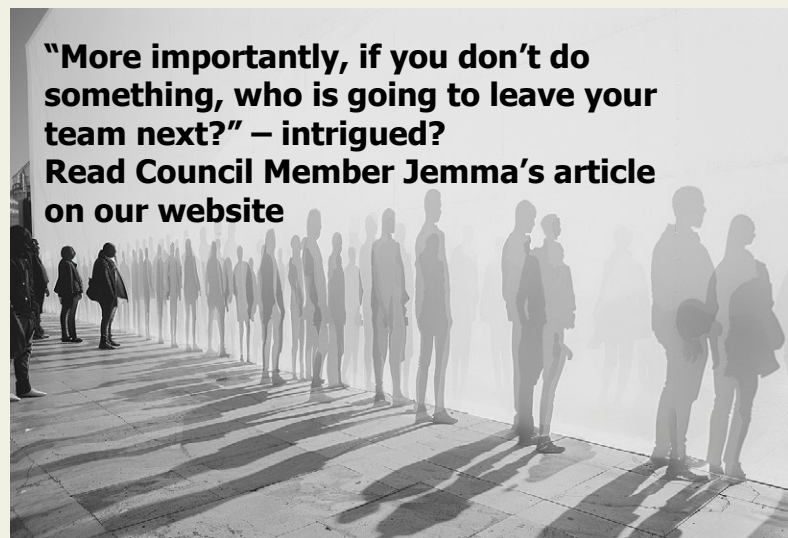
Lithium has uniquely useful properties. It is less dense than water, has excellent thermal and electrical conductivity. Indigenous peoples in the Atacama Desert region of Chile, where lithium is mined, claim water supplies are poisoned and dwindling, trees and flamingos dying; all is covered in a fine dust as the rocks bearing lithium are crushed to a powder which is flooded with water in huge lagoons. This is not hearsay or a result of ivory tower research by Conway – in true journalistic fashion he's been to see for himself. Plundering the earth has a price that we try to ignore.

The fear is the next 'front-line' in the battle for control of materials will be the sea. There are vast deposits of precious metals under the seas which the International Seabed Authority (ISA) is meant to police – at least to ensure such resources are shared. Great nodules like giant potatoes, of magnesium, nickel, cobalt, copper, lie temptingly on the ocean floor. The USA has not signed the ISA treaty and there are concerns the ISA lack sufficient teeth.

Conway tackles oil and coal as well. There is little cheer in his book except for a vain hope that because we have created such huge quantities of, for example, steel and copper, our plundering of virgin ores may reduce as we learn how to recycle.....

Do read the book!

**"More importantly, if you don't do something, who is going to leave your team next?" – intrigued?**  
**Read Council Member Jemma's article on our website**





# IES

## Engineering Hall of Fame

### Sir Jim McDonald Born 1957



Electrical engineer, educator and government adviser. President of Royal Academy of Engineering 2019-24

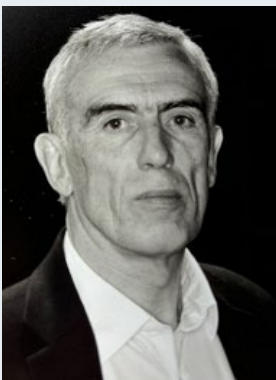
#### Engineering Achievements

Jim was born in Glasgow and studied electrical engineering at Strathclyde University spending 7 years in the electric utility sector before returning to Strathclyde in 1984 as lecturer in Electronic and Electrical Engineering. He was appointed to the Rolls-Royce

Chair of Electrical Power Systems in 1993 and became Principal and Vice-Chancellor in 2009. In 2012 he was knighted for services to education, engineering and the economy, and Knight Grand Cross in 2023 for services to engineering, education and energy. In 2019 he was the first Scottish engineer to become President of the Royal Academy of Engineering.

Sir Jim co-chairs, with the First Minister, the Scottish Government's Energy Advisory Board. He is Chairman of the Independent Glasgow Economic Leadership Board and is a past-Chair of the Board of the Glasgow Science Centre.

### David Milne Born 1942



Co-founder of Scotland's first university spin-out which became a highly successful micro-electronics company

#### Engineering Achievements

David Milne was born in Edinburgh and graduated from Heriot Watt University in Applied Physics then studied for a PhD at the University of Bristol. He was recruited to the Scottish Microelectronics Institute in the University of Edinburgh

becoming its Director at the age of 31. This was to become the first successful spin-out from a Scottish University and the second to be listed on the London stock exchange - as Wolfson Microelectronics plc. With his co-founder Jim Reid he developed world-leading digital consumer electronics components selling into the top brands of mobile phones, tablets, hi-fi systems, televisions, sat-navs, video games and much else.

He was voted Entrepreneur of the year in 2003 and 2006, Scottish CEO of the year in 2006 and TechMark Personality of the Year in 2006. He also received the Third Millennium Medal for Outstanding Achievements and Contributions from the US Institute of Electrical and Electronic Engineers. Wolfson Microelectronics was nominated as the best new company to join the London market in 2004 and won the Best Technology Award for a British plc in 2005. It has also received two Queen's awards for innovation and export. He was awarded the RSE Royal Medal in 2012.

David Milne has had a key influence in the digital revolution.

### David Boswell Reid 1805 – 1863



Building services engineer and researcher. "The grandfather of air-conditioning"

#### Engineering Achievements

Reid was the first to study the relationship between freshness of air and human wellbeing or disease in his custom-built laboratory in Edinburgh. His use of questionnaires for user feedback is probably the first attempt at occupant satisfaction surveys and post occupancy

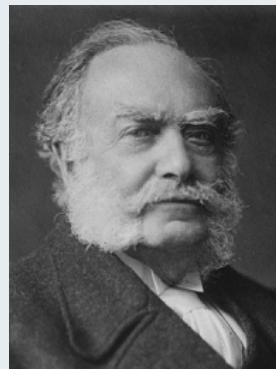
evaluation of completed buildings.

His design for St George's Hall, Liverpool is regarded as the earliest example in the world of a modern, integrated heating and ventilation system.

He was appointed to make improvements to the House of Commons ventilation for the temporary accommodation after the fire of 1834, and later appointed to the new building but his uncompromising nature and differences of priorities led to a quarrel with the architect Charles Barry who resented his requirements for large air ducts. So his design was only partially adopted, and not without unwelcome (to Reid) constraints.

He is regarded as the grandfather of air-conditioning.

### Sir Alfred Fernandez Yarrow 1842 – 1932



Founder of a great shipbuilding dynasty on the Clyde

#### Engineering Achievements

Born in London in 1842 and apprenticed to a firm making marine engines. He designed a steam carriage which ran at about 25mph in Greenwich until one hit a mounted policeman and he broke his leg – which led to parliament banning steam carriages unless preceded by a man with a red flag. He then turned

to building steam launches for river navigation, neatly avoiding the man with a flag problem, and then increasingly larger civil and military vessels, with, eventually, fast torpedo boats progressing on to even faster torpedo boat destroyers.

Sir Alfred Yarrow was the progenitor of a great shipbuilding dynasty whose business outgrew Poplar in London and he moved it lock, stock and barrel to Scotstoun on the Clyde in 1906 where his first destroyer was launched in 1908. No less than 29 destroyers, 16 gunboats, 1 submarine, 3 hospital ships and 1 floating workshop were built in the Scotstoun yard during the First World War alone, a huge contribution to ultimate victory. Alfred Yarrow was also a great philanthropist giving to many charitable causes in his time.