

NEWSLETTER

January 2017

Happy New Year From Your IMechE In South Wales



The IMechE in South Wales has increased its engagement with local politicians in order to promote engineering. At a recent Insight event held in the Senedd (above), Assembly Members heard about STEM activities in Schools, including industrial placements for teachers

During the past year, we have restructured our committee into four Working Groups covering the four focus areas of Development, Outreach, Education and Engagement. In this way, we hope that the committee will work more effectively and be enabled to deliver progress in all areas of IMechE activity in South Wales. We have also welcomed a number of new members to the committee, representing various key industries within South Wales, and we hope that their input will give our activities renewed focus and relevance. We would welcome any members who have an interest in joining the committee and helping to deliver our events and activities in South Wales, to contact the Chairman (swaleschair@imechenearyou.org).

We have also continued to develop our activities in terms of working more closely with our regional universities, expanding our promotion of engineering to the next generation within schools and colleges. We have been working more closely with our local industries, and local, regional and national government organisations. Please check your emails for details of our events, and promote the events in your own organisations. Posters are available to download for each event from the South Wales Region section of the IMechE website:

<https://nearyou.imeche.org/near-you/UK/South-Wales>

Reviews – Past Events

Lecture - From Draentewion to Barry – 8th February 2016

This heritage-themed lecture by Dr. David Jenkins, Principal Curator at the National Waterfront Museum in Swansea, covered David Davies' rise from humble origins to become one of the most remarkable people of Victorian Wales, founder of Barry Docks and owner of one of the most profitable and dynamic coal companies in South Wales. The event, held at the Holiday Inn near Coryton, Cardiff, attracted a good number of members and friends, who heard a fascinating talk with many historical images. David Davies started his career as a contractor building roads and bridges, and later became heavily involved in railway construction, building railways in mid and west Wales. He owned many collieries, and constructed docks and a railway at Barry in order to export his coal without paying charges to use the existing docks at Cardiff. His legacy can be seen in many locations in South Wales, not least the docks at Barry which are still in regular use. Watch out for another interesting heritage lecture in our 2017 programme.



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If you have any comments about this Newsletter or would like to contribute to future editions, then please do not hesitate to contact us.

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Lecture - Lighting Interaction with Composite Aircraft – 15th March 2016

On Tuesday 15th March Dr. Daniel Mitchard of the Cardiff University based Morgan-Botti Lightning Laboratory came to Swansea University to present to us on how lightning interacts with aircraft now that they are predominantly manufactured from composite materials. Dr Mitchard started off the talk by describing how the laboratory in Cardiff actually works. Utilising some very large capacitors and bespoke switch gear, the laboratory can generate up to 200kA of current or *lightning* to simulate a typical strike. This figure is the maximum that has been seen in nature, however, 100kA is typically used for regular testing purposes.

From initial experiments using non-metallic and metallic models to the more complex composite models, Dr Mitchard demonstrated how the lightning hunts for a low impedance path to earth and typically this is via the aircraft. Following on from this, demonstration videos were shown on the measures aircraft manufacturers employ to mitigate the effects of a lightning strike. One such measure was the incorporation of a wire mesh which acts as a “faraday cage” so that the current flows around the outer body of the aircraft. Dr Mitchard brought along numerous visual aids which stimulated a lot of post-talk discussions with the many students that were in attendance.

The South Wales Region would like to thank Dr. Mitchard for giving the talk during National Science & Engineering Week.



Social Event – An Evening with Lowri Morgan – 25th March 2016

On Friday 25th March The South Wales Region held its 5th Members & Partners evening. This event was originally set up to welcome new members and their partners to the IMechE. This year our speaker for the evening was Lowri Morgan who is an extreme athlete. Lowri is one of only six people in the world to ever complete the notoriously difficult 350 mile non-stop footrace '6633 Ultra' in the Arctic and the challenging Jungle Ultra Marathon in the Amazon Forest.

S4C's (Channel 4 Wales') cameras followed her adventures in the highly acclaimed Ras yn Erbyn Amser (Race Against Time) series, which Lowri also produced. Both series were awarded numerous awards including the highest accolade in the Celtic Media Festival and won Best Presenter and Best Documentary Series at the 2012 BAFTA Awards. The first series saw Lowri completing the Jungle Marathon in the Amazon. In the heat and humidity of the jungle, out of the 150 top runners only 50 finished. She finished the race in the top ten in her first ever ultra marathon.

What shone through during the talk was Lowri's vast amount of fitness, resilience, positive mental attitude and at times stubbornness, which she has in order to achieve her goals! The talk was followed by an excellent Q&A session and a buffet.

Annual Dinner with Wg. Cdr. Andy Green – 6th May 2016

On Friday 6th May the South Wales Region held its annual dinner in City Hall, Cardiff. In 2016 nearly 100 guests had the pleasure of listening to and meeting Wg. Cdr. Andy Green who is the pilot of the Bloodhound SSC which will be making an attempt on the world land speed record in 2017. Andy currently holds the record which was set at 763mph in 1997 in the Thrust SSC vehicle. Andy started his speech by recounting his career and the series of events that have lead him and the bloodhound team to the verge of the land speed record attempt. He also mentioned the considerable

amount of work that has been undertaken in Wales by Swansea University in the field of computational fluid dynamics to ensure that the car will run and be stable at speeds in excess of 1000mph. He also relayed that some of the problems faced by the engineering team with regards to the car's performance and handling are still unknown, because no one has ever attempted anything like this before!

After the dinner, Andy was on hand to answer questions from the audience and sign autographs for the many people who stayed on to speak with him.

We were also joined by President Elect, Jon Hilton who gave us his vision of what he would like to do during his presidency in 2016-2017. Jon has had a very successful career in motorsport which would be the envy of many engineers working in the field today. It was very refreshing to hear that he wanted engineers to help each other and share knowledge where they are able and to collaborate as much as possible.

Special thanks must also go to the Taliesin String Quartet who provided the entertainment for the evening.





AGM Lecture – Cavitation in pumps – 17th May 2016

This was the second time that the South Wales Region have held a lecture after the AGM and nearly 50 people came along to listen to Dennis Goodlad talk about the phenomena of cavitation in centrifugal pumps. Following a review of pump hydraulics theory and having introduced the cavitation phenomenon, Dennis showed some excellent high speed photography detailing the actual air bubble collapse and the resultant release of energy which leads to erosion of the pump impeller. The audience contributed through the lecture by bringing various case studies of their own to share with the rest of the group which stimulated the discussion around the topic of pumping and the inherent problems that these can bring to hydraulic systems. Finally Dennis discussed ways to alleviate cavitation in pumps and the steps designers could take to reduce the chances of this occurring in hydraulic systems. Several case studies were presented during the talk including a large sewage pumping system installed at Beckton in London.

Lecture – Engineering Safer Aircraft – 27th September 2016

Dr. Ryan Marks, Research Associate from Cardiff University came Hereford to give this talk on our behalf on the structural health monitoring work that he has been undertaking in partnership with aerospace companies who are looking to take condition monitoring of aircraft to the next level. The talk commenced with a look back at the aircraft failures of the past and examined the underlying causes of these incidents. Ryan talked about the acoustic emission work that has been done to highlight potential areas of damage in the aircraft structure before they become dangerous. He showed us the intention to create a “central nervous system” on an aircraft, similar to the human body, by including a range of sensors so that any damage sustained to the aircraft is automatically detected and analysed for its potential severity.



Professional Registration Event – Routes to Professional Registration – 22nd November 2016

Alan King, IMechE Business Development Manager, presented a talk and workshop on Professional Registration. In particular, Alan’s focus was on the route from EngTech (professionally registered engineering technician) to CEng (Chartered Engineer). There was a good number of people in attendance who were interested in progressing their membership with the IMechE.

We will be developing further events themed around professional registration, with events focussed on particular industries, companies or universities. Should members be interested in progressing applications for professional registration, please get in touch with the committee for advice and support.

Forthcoming Events

Hybrid Propulsion of Naval Auxiliary Vessels

7th February 2017, 6pm at The Holiday Inn, M4 Jcn 32, Tongwynlais, Cardiff, CF15 7LH

The introduction of affordable and reliable Active Front End (AFE) power electronics technology now enables the marine Power and Propulsion (P&P) designer to employ a hybrid design to achieve efficient electric drive for cruise speeds and cost effective mechanical drive for faster speeds.

Electrification of the Severn Tunnel – Lecture and Railway Careers Event

13th February 2017, 5pm at Cardiff University, School of Engineering (Trevithick Lecture Theatre)

The presentation is focused on the Electrification's Works on the South Wales mainline section of the Great Western Route Modernisation Programme, covering the scope, interfaces and progress to date. Particular focus will be given to the Works to provide electrification through the Severn Tunnel. Employers within the railway industry will also be on hand to discuss careers at a student networking event following the lecture.

The design of the world’s fastest car, Bloodhound SSC – an engineering adventure

14th March 2017, 6pm at Swansea University, Bay Campus

CFD Lecture with a Bloodhound SSC Theme Lecture will be held in Room B004 - Engineering Central. This joint lecture with the South Wales Materials Association and IoM³ forms part of National Science and Engineering Week. Dr. Ben Evans will provide details of the advanced simulation work necessary to develop the aerodynamics of the Bloodhound vehicle.

Members and Partners Evening – Social Event

24th March 2017, 7pm at Bear Hotel, Cowbridge

Our annual relaxed social event in the delightful setting of the Bear Hotel in Cowbridge. This year we will be joined by Phil Jay, a full time professional magician for twenty-two years who has been recognised as one of the very best table magicians in the UK. We will also hear from Martin McCann, Chief Executive of the charity RedR. RedR is international NGO whose stated mission is to “rebuild lives in times of disaster by training, supporting and providing aid workers to relief programmes across the world.” It was originally an acronym for Register of Engineers for Disaster Relief. Martin will talk to us about the work of RedR, and the opportunities for engineers to support their activities. Our evening will be accompanied by a hot buffet, and a licensed bar. Booking for the event is via the IMechE South Wales website.

South Wales Region Annual Dinner

5th May 2017, 7pm at City Hall, Cardiff

Once again we will be in the delightful surroundings of Cardiff City Hall. We are in the process of finalising an outstanding speaker for this event, but can guarantee that the usual excellent food, convivial company and exquisite surroundings will make this an evening to remember. Previous speakers have included Derek Brockway, Andy Green, Wynne Evans and Mark Gallagher, all of whom provided excellent after-dinner entertainment. Tickets are still at the excellent price of £40 each for members and their guests, £65 for non-members and £25 for students. Tickets are available to book now via the South Wales region website, and full details of the speaker will be announced in due course.

Engineering Heritage Lecture

16th May 2017, 7pm at The Holiday Inn, M4 Jcn 32, Tongwynlais, Cardiff, CF15 7LH

This lecture will follow the Annual General Meeting (see below). It will be on an engineering heritage theme, and will be given by John Wood, MBE, who is a Past President of the IMechE and a member of the IMechE Heritage Committee.

For more information on all events, and to download the event posters to promote IMechE South Wales events in your own organisation, please go to:

<https://nearyou.imeche.org/near-you/UK/South-Wales/events>

The Administration Team may also be contacted regarding these events at swalesadmin@imechenearyou.org



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Regional Matters

Notice of Annual General Meeting

Notice is hereby given that the 2017 Annual General Meeting of the South Wales Region of the Institution of Mechanical Engineers will be held on:

Date: Tuesday 16th May 2017
Time: 6:00 for 6:15 p.m.

Venue: The Holiday Inn, Cardiff North, M4 Jcn. 32,
Merthyr Road, Tongwynlais, Cardiff, CF15 7LH

Nominations for the Regional Committee, including the signature of the nominator and signed written consent of the nominee(s) should be sent at the earliest opportunity and before 16th April 2017 to:

Dave Harwood, Secretary, IMechE South Wales Region

Email: swalessec@imechenearyou.org

Please note that the AGM will be followed by an Engineering Heritage lecture by John Wood, MBE, Past President

Rule 18(b) – After the list of nominations by the Committee has been presented at the meeting, any member of the Branch/Region who is a Corporate Member of the Institution shall be entitled to add to the list a candidate for election to any or each of the offices to be filled, by causing to be delivered to the Chairman at the meeting nominations signed by him as nominator, together with the written consent of his nominees. Any additions shall be confined to the offices of the Committee for which the nominations have been made by the Committee.