

## William Menelaus Memorial Lecturers

1927	<b>Sir William H Bragg</b> KBE FRS DSc	1995	<b>Sir Keith Stuart</b> MA FRSA CBIM FCIT
1928	H.C.H. Carpenter FRS MA PhD Hon DSc(Wales)	1997	Sir Robert May FRS
1929	<b>W.H. Hatfield DSc FRS</b>	1999	<b>Dr. Elizabeth Haywood CIMgt FRSA</b>
1930	H.G.A. Hickling DSc FRS	2001	Dr. David Grant CBE FREng
1931	<b>F.S. Sinnatt CB DSc</b>	2003	<b>Sir Peter Williams CBE FREng FRS</b>
1932	J.W. Cobb CBE BSc FIC	2004	Sir Alec (now Lord) Broers FREng FRS
1933	<b>C.A. Edwards DSc FRS</b>	2005	<b>Sir David Davies FREng FRS</b>
1934	C.H. Desch DSc FRS	2006	Sir Gareth Roberts FREng FRS
1935	<b>W.T. David MA ScD DSc MInstCE</b>	2007	<b>Sir John Chisholm FREng FRS</b>
1936	B.P. Haigh MBE DSc MInstCE	2008	Sir Richard Friend FREng FRS
1937	<b>C.H. Lander</b> CBE DSc MInstCE	2009	<b>Lord Browne of Madingley</b> FREng FRS
1938	W.M. Thornton OBE DSc DEng	2010	Prof Dame Ann Dowling FREng FRS
1940	<b>Sir Arthur P.M. Bleming CBE</b> DEng MSc(Tech) MIMechE MIEE	2011	<b>Prof. Dame Julia Higgins</b> DBE FRS FREng
1945	Sir Lewis L. Fermor OBE DSc FRS	2012	Prof. The Lord Rees of Ludlow OM FRS FREng
1946	<b>C.G. Morley MIEE</b>	2013	<b>Sir John Cadogan CBE</b> DSc FRSE FRSC PLSW FRS
1947	Douglas Hay MC BSc MInstCE	2014	Sir John Armit CBE FREng FICE
1948	<b>P.B. Moon MA PhD FRS</b>	2015	<b>Prof Hywel Thomas FREng MAE</b> FLSW FRS
1949	W F Cartwright DL MIMinE	2016	Sir Emyr Jones Parry GCMG FInstP PLSW
1952	<b>W. Idris Jones CBE</b> BSc PhD MIMinE MICHemE FRIC	2017	<b>Prof Dame Jocelyn Bell Burnell</b> CBE FRS FRAS PRSE PPIoP PPRAS
1954	Sir William Halcrow MInstCE	2018	Sir John O'Reilly DSc FREng FLSW FIET
1957	<b>Sir Charles F. Goodeve</b> OBE DSc FRS	2019	<b>Prof Lord Robert Mair</b> CBE FREng FRS FICE
1960	T.E. Allibone PhD DSc FRS MIEE		
1963	<b>Sir Willis Jackson DSc MIEE FRS</b>		
1965	Sir Humphrey Browne CBE MA MIMinE		
1967	<b>Sir William Penney</b> KBE FRS MA PhD DSc		
1970	Sir Paul Chambers KBE DB CIE		
1971	<b>Lord Pilkington</b>		
1973	Dr. K. Mallanby CBE DSc FIBiol		
1976	<b>Sir Kingsley Dunham FRS</b>		
1977	Sir Derek Ezra		
1979	<b>Dr. Walter Marshall CBE FRS</b>		
1981	Sir Joseph Pope DSc (Hon) LLtd FBIM CEng FIMechE		
1983	<b>Sir Peter Gadsden</b> CBE MA DSc FEng		
1985	Lord Caldecott		
1987	<b>Prof. J. Notting</b>		
1989	Colin Kirkland		
1991	<b>G. Adler OBE</b>		
1993	Dr. Hugh Scott-Russell CEng FSAIMM		

## The South Wales Institute of Engineers Educational Trust

Chairman:  
**Mr Philip E. Hourahine**



## The 59<sup>th</sup> William Menelaus Memorial Lecture

In Association with  
**The Learned Society for Wales and**  
Supported by **Cardiff University**

**“Smart civil engineering infrastructure and  
construction”**

Presented by:  
**Professor Lord Robert Mair**  
CBE FREng FICE FRS

6.00pm, Monday 18<sup>th</sup> March, 2019  
In the **Large Shandon Theatre,**  
**Main Buildings, Cathays Park, Cardiff**

## The 59<sup>th</sup> William Menelaus Memorial Lecture



Robert Mair is Emeritus Professor of Civil Engineering and Director of Research at Cambridge University, where until recently he was Head of Civil Engineering. He was Master of Jesus College 2001-2011 and Senior Vice-President of the Royal Academy of Engineering 2008-2011. He is currently President of the Institution of Civil Engineers. Prior to his appointment to a Chair at Cambridge in 1998, he worked in industry for 27 years. In 1983 he founded the Geotechnical Consulting Group, an international consulting company based in London. He has been responsible for numerous major engineering projects world-wide, is an international research leader in geotechnical engineering and is a world expert on underground construction in soft ground.

Throughout his career he has specialised principally in underground construction, providing advice on numerous civil engineering projects world-wide involving soft ground tunnelling, retaining structures, deep excavations and foundations. International projects have included railway and metro tunnels in Amsterdam, Athens, Barcelona, Bologna, Florence, Hong Kong, Istanbul, Rome, Singapore and Warsaw, and motorway tunnels in Turkey. In the UK he was closely involved with the design and construction of the Jubilee Line Extension for London Underground, and with the Channel Tunnel Rail Link (now HS1) and Crossrail projects. He was responsible for the introduction of compensation grouting in the UK as a novel technique for controlling settlement of structures during tunnel construction. The technique was widely used on the Jubilee Line Extension Project for the protection of many historic buildings, including the Big Ben Clock Tower at the Palace of Westminster, and is now being extensively applied on projects around the world. He has been a member of Expert Review Panels on major international underground construction projects, and until recently was Chairman of the International Advisory Board for the Singapore Land Transport Authority, advising on design and construction aspects of all underground transport tunnels and deep excavations in Singapore.

His principal research interests are in the development of innovative engineering solutions for the design and construction of underground space in complex ground conditions, particularly in urban environments. He leads a major research group at Cambridge, and is Principal Investigator for the Centre on Smart Infrastructure and Construction (CSIC), funded by EPSRC, Innovate UK and industry to a total value of £22m. His research is on developing new technologies for streamlining construction and for condition assessment and monitoring of ageing infrastructure, with a focus on the development of wireless sensor networks, MEMS technologies and new fibre optic sensing technology. CSIC has around 50 industry partners and has deployed innovative sensor technologies (notably fibre optics and wireless sensors) on around 100 different sites.

He was Chairman of the Royal Society/Royal Academy of Engineering Report to the Government on Shale Gas and Hydraulic Fracturing, published in 2012. He is Chairman of the Science Advisory Council of the Department for Transport. He was elected a Fellow of the Royal Academy of Engineering in 1992 and of the Royal Society in 2007. He was appointed an independent crossbencher in the House of Lords in 2015 and is a member of the House of Lords Select Committee on Science and Technology.

## The South Wales Institute of Engineers Educational Trust (SWIET2007)

The Institute was founded in 1857 and granted a Royal Charter of Incorporation in 1881. It devotes itself **“to the encouragement and advancement of Engineering Science and Practice”**, and was **“established to facilitate the exchange of information and ideas amongst its members, and to place on record the results of experience”**. In carrying out these functions, the Institute played its part in advancing technical knowledge and, through its individual members, has made important research contributions in many fields, through to 2007.

In 2007, the Institute agreed to wind up its Learned Society functions, and to transfer all its funds into an Educational Trust, devoted to the promotion of engineering with young people. The Trust has agreed to continue with the Menelaus Lecture and Dinner as part of its activities.

The Institute now makes Bursary, merit and other awards, to both individual engineering students and educational establishments, supports activities which encourage and develop young engineers, and focuses upon “youth into engineering”, in schools, colleges and other establishments, at profession “entry” levels.

### The Learned Society of Wales (LSW)

The Learned Society of Wales is Wales’s first national scholarly academy. It was established and launched in May 2010. It now has more than three and fifty Fellows, who are prominent figures within their respective academic disciplines. The Society’s guiding ethos is *Celebrating Scholarship and Serving the Nation*: as well as to celebrate, recognise, safeguard and encourage excellence in every one of the scholarly disciplines, its purpose is also:

- to promote the advancement of learning and scholarship and the dissemination and application of the results of academic enquiry and research; and
- to act as a source of independent and expert scholarly advice and comment on matters affecting the wellbeing of Wales and its people and to advance public discussion and interaction on matters of national and international importance.

The Society’s *Strategic Aim* is to be a sustainable organisation that is fit for purpose and that is acknowledged both as the recognised representative of the world of Welsh learning internationally and as a source of authoritative, scholarly and critical comment and advice to the National Assembly and other bodies on policy issues affecting Wales.

The Learned Society of Wales is keen to develop established links with organisations like SWIET2007 that have complementary aims and is particularly pleased to be associated with this evening’s Menelaus Lecture by its current President.

Denys Morgan, Chief Executive, SWIET2007, Tel: 01792 879409