

Professor Lord Robert Mair CBE FREng FICE FRS NAE

Robert Mair is Emeritus Professor of Civil Engineering and Director of Research at Cambridge University. He was until recently the Sir Kirby Laing Professor of Civil Engineering, and was Head of Civil Engineering 1999-2016. He was Master of Jesus College 2001-2011, Senior Vice-President of the Royal Academy of Engineering 2008-2011 and President of the Institution of Civil Engineers 2017-18. He was appointed Chief Engineering Adviser to the Laing O'Rourke Group in 2011. Prior to his appointment to a Chair at Cambridge in 1998, he worked in industry for 27 years, throughout which time he maintained and developed close links with the academic world. In 1983 he founded the Geotechnical Consulting Group, an international consulting company based in London. He has been responsible for advising on geotechnical and tunnelling aspects of numerous major engineering projects world-wide. He has extensive experience of dealing with industry, Governments and both professional and academic institutions, in the UK and overseas. From 2007-14 he was Chairman of the Singapore Government's International Advisory Board on design and construction aspects of all their underground metro and road tunnels. He was a member of Crossrail's Engineering Expert Panel. He is Head of the Centre on Smart Infrastructure and Construction (CSIC) at Cambridge, funded by EPSRC/Innovate UK and industry to a total value of £22m. He was Chairman of the Royal Society/Royal Academy of Engineering Report on Review of Shale Gas and Hydraulic Fracturing, published in 2012. He is Chairman of the Science Advisory Council of the Department for Transport. He was appointed an independent crossbencher in the House of Lords in 2015 and is currently a member of its Select Committee on Science and Technology.

Education

- Clare College, Cambridge, B.A. 1971, M.A. 1975, PhD 1979

Professional Qualifications and Awards

- Member of the Institution of Civil Engineers, 1976-1990
- British Geotechnical Society Prize, 1980
- Fellow of the Institution of Civil Engineers, 1990
- Elected Fellow of the Royal Academy of Engineering, 1992
- Institution of Civil Engineers Geotechnical Research Medal, 1994
- South African Institution of Civil Engineers Jennings Award, 2004
- Institution of Civil Engineers Gold Medal 2004
- Institution of Civil Engineers Crampton Prize 2006
- South African Institution of Civil Engineers Jennings Award, 2006
- President of the Institution of Civil Engineers Spirit of Telford Award, 2007
- Elected Fellow of the Royal Society, 2007
- Institution of Civil Engineers Crampton Prize 2008
- Awarded CBE in the 2010 New Year Honours for services to Engineering
- Awarded Honorary DSc by University of Nottingham, 2011
- Singapore Public Service Medal 2011
- Institution of Civil Engineers President's Medal 2013
- Institution of Civil Engineers Crampton Prize 2015
- Appointed independent crossbench peer in House of Lords 2015

- Elected Honorary Fellow, Clare College Cambridge 2016
- Elected Honorary Fellow, Jesus College Cambridge 2017
- President of Institution of Civil Engineers 2017-18
Awarded Honorary DSc by University of Leeds, 2018
Awarded Honorary DSc by Imperial College, London, 2018
Elected Foreign Member of the National Academy of Engineering (USA) 2019

Appointments Held

- Engineer, subsequently Principal Engineer, Scott Wilson Kirkpatrick, working in London and Hong Kong offices, 1971-1983. Seconded to Cambridge University, 1976-1979.
- Founding Director and Managing Director of Geotechnical Consulting Group, London, 1983-1998; Director and subsequently Senior Partner of LLP, 1998 – present.
- Special Professor, Department of Civil Engineering, Nottingham University, 1994-7
- Royal Academy of Engineering Visiting Professor, Cambridge University, 1997-8
- Professor of Geotechnical Engineering, Cambridge University, appointed 1998. Head of Civil and Environmental Engineering Division 1999-2016. Fellow of St John's College, 1998 – 2001. Sir Kirby Laing Professor of Civil Engineering, 2011-2017. Emeritus Professor of Civil Engineering and Director of Research, 2017 - present
- Master of Jesus College, Cambridge, 2001- 2011
- Appointed Honorary Professor Tongji University, Shanghai, 2008
- Chairman, Science Advisory Council, Department of Transport, 2014 – present
- Independent Crossbench Member of House of Lords 2015 – present

Invited Lectures

- Institution of Civil Engineers Unwin Memorial Lecture, 1992
- Keynote State-of-the-Art Lecture on Bored Tunnelling in the Urban Environment, 14th International Conference on Soil Mechanics and Geotechnical Engineering, Hamburg, 1997
- Keynote Lecture, International Conference on Case Histories in Geotechnical Engineering, St Louis, Missouri, 1998
- Keynote Lecture, International Tunnelling Association Conference on Tunnels and the Metropolis, Sao Paulo, Brazil, 1998
- Sir Harold Harding Memorial Lecture, Institution of Civil Engineers, 1998
- Invited Lecture at 50th Anniversary Celebration of Japanese Geotechnical Society, 1999
- Guest Lectures at Northern Jiatong University, Railway Institute (Shijiazhuang) and Tongji University, China, 1999

- Guest Lecture to CFMS (French Geotechnical Society), Paris, May 2000
- Keynote Lecture, International Young Geotechnical Engineers Conference, Southampton, 2000
- Vienna Terzaghi Lecture, Vienna, 2001
- Szechy Lecture, Budapest, 2001
- Keynote Lecture, International Conference on Response of Buildings to Excavation-induced Ground Movements, Imperial College, London, 2001
- Athenian Geotechnical Lecture, Athens, 2002
- Jiminez Salas Lecture, Madrid, 2003
- Paviers Lecture, London, 2004
- Jennings Lecture, Johannesburg, 2004
- Keynote Lecture, International Conference on Geotechnical Aspects of Underground Construction in Soft Ground, Amsterdam, 2005
- Rankine Lecture, London, 2006: 'Tunnelling and Geotechnics: New Horizons'
- Guest Lecture at Distinguished Lecture Series, UC Berkeley, 2006
- Royal Society Public Lecture, 2009
- ICE/TRF Lecture at the Institution of Civil Engineers, 2009
- Muir Wood Lecture, ITA World Tunnel Congress, Helsinki, 2011
- Keynote Lecture, XV European Conference on Soil Mechanics and Geotechnical Engineering, Athens, 2011
- Distinguished Lecturer, Institute of Advanced Studies, HKUST, Hong Kong, 2011
- Invited Speaker, Hay Festival 2014
- Keynote Lecturer, 8th International Conference on Underground Construction in Soft Ground, Seoul, 2014
- Casagrande Lecture, Boston Society of Civil Engineers, USA, 2014
- Royal Academy of Engineering Hinton Lecture 2015
- Newcomen Society Dickinson Lecture 2016
- Institution of Civil Engineers Smeaton Lecture 2017
- Menelaus Lecture, Cardiff, 2019

External Activities, Committees

Professional

- Chairman of the Construction Industry Research and Information Association (CIRIA) Ground Engineering Committee, 1985-1987
- Member of the Council of the Institution of Civil Engineers, 1993-5
- Chairman of the Ground Engineering Board of the Institution of Civil Engineers, 1993-6
- Member of the Institution of Civil Engineers Commission on the Use of Sprayed Concrete Linings for Tunnels in Soft Ground, 1994-5
- Member of the French Government Commission of Enquiry into the Collapse of the Toulon Tunnel, 1997 (one of 3 members)
- Member of the Board of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE: 16,000 members), 1997-2001
- Chairman of ISSMGE Finance Committee, 1997-2001
- Chairman of ISSMGE Technical Committee on Underground Construction 1996 - 2005
- Member of Royal Academy of Engineering Industrial Secondment Committee, 1999-2002

- Member of Royal Academy of Engineering Membership Committee, 2000-03
- Member of the Quality Assurance Group advising the UK Committee for Radioactive Waste Management, 2006
- Member of Council of the Royal Academy of Engineering, 2008 – 2011
- Member of Industry & Engineering Committee, Royal Commission for the Exhibition of 1851, 2012 - present
- Chairman, Royal Society/Royal Academy of Engineering Review of Shale Gas, 2012
- Member of UK Government's Construction Industrial Advisory Council,
- Commissioner, Royal Commission for the Exhibition of 1851, 2014 - present
- Member of Infrastructure Cost Review Steering Group, Infrastructure UK, 2014
- Chairman, Science Advisory Council of the Department for Transport, 2014 – present
- Member, Expert Advisory Group, National Infrastructure Commission, 2016 – present
- Member of House of Lords Select Committee on Science and Technology, 2016 – present
- Member, Expert Advisory Panel, Committee on Climate Change, 2017 - present

Academic, Research Committees, Journal Editorial Boards etc

- Member of Advisory Panel for journal *Géotechnique*, 1981-4
- Member of the SERC Geotechnics Steering Group, 1983-8
- Member of Editorial Advisory Board for journal "Tunnels and Tunnelling", 1983-6
- Member of Advisory Committee, Department of Civil Engineering, City University, 1983-6
- Chairman of London University Geotechnical Centrifuge Management Committee, 1986-1990
- Member of Advisory Committee, Department of Civil Engineering, Nottingham University, 1994-7
- Chairman of Organizing Committee for International Conference on Geotechnical Aspects of Underground Construction in Soft Ground, London, 1996
- Member of Board of Management for DoE/EPSRC LINK Collaborative Research Project between industry and Imperial College on Subsidence Damage to Buildings, 1996-00
- Member of Committee for Imperial College Industrial Bursary Scheme, Department of Civil Engineering, 1996-9
- Member of Editorial Advisory Board for journal "Rivista Italiana di Geotecnica"
- Chairman of Organizing Committee for IS Tokyo '99 (2nd International Conference on Geotechnical Aspects of Underground Construction in Soft Ground), 1999
- Member of Civil Engineering Panel for HEFCE Research Assessment Exercise 2001
- External examiner for Imperial College MSc Courses in Soil Mechanics, and Soil Mechanics and Environmental Geotechnics, 1999-2002
- External PhD examiner at Universities of Cambridge, Nottingham and Surrey, City University, Queen Mary College, Imperial College, Technical University of Delft and INSA, University of Lyon

Professional and Research Interests

- Throughout his career Robert Mair 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. Recent 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 Bolu, 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 is currently advising on design and construction aspects of HS2.

- He was responsible for the introduction of compensation grouting in the UK as a novel technique for controlling settlement of structures during tunnel construction - on the Waterloo Escalator Tunnel Project. 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. Large numbers of buildings in central London have been successfully protected from subsidence by this technique during construction of Crossrail.

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. He was one of the three members of the French Government Commission of Enquiry into the collapse of a road tunnel in Toulon.

- On taking up his appointment to a Chair in Engineering at Cambridge in 1998 Robert Mair introduced new avenues of research, and in particular strengthened the Geotechnical Group's contacts with industry. He organized a successful £2m bid for a Joint Infrastructure Award for the construction and equipping of a new two-storey building: the Centre for Geotechnical Process and Construction Modelling. This building is immediately adjacent to the existing centrifuge facility on the West Cambridge site and is part of the Schofield Centre. The aims of this Centre are to develop new research areas concerning innovative construction techniques. The main thrust of the research is in the areas of underground construction, earthquake engineering, environmental geotechnics (the prevention and remediation of ground contamination), and foundation engineering, as well as in fundamental soil mechanics.
- More recently he was responsible for obtaining £18m Government funding for the new Civil Engineering Building on the West Cambridge site of the Engineering Department as part of the UK Collaboratorium on Research on Infrastructure and Cities (UKCRIC) initiative. The £38m building, which opened in 2019, contains the National Research Facility for Infrastructure Sensing.
- 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 also leads research involved with 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. He is Principal Investigator and Head of the Centre on Smart Infrastructure and Construction (CSIC), funded by EPSRC/Innovate UK and industry to a total value of £22m. 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 until recently also Director and

Head of Cambridge's new Centre for Doctoral Training on Future Infrastructure and the Built Environment, funded by EPSRC.

- Robert Mair led the establishment in 2010 of the Laing O'Rourke Centre for Construction Engineering and Technology at Cambridge, a new multi-disciplinary academic centre of excellence to advance the engineering profession and leverage innovative thinking to benefit the construction industry. This has resulted in a unique partnership between the University of Cambridge and Laing O'Rourke, the UK's largest private construction company. The partnership supports a new Professorship, as well other academic staff and a new Masters course, together with significant research funding. The total committed funding for this initiative was £10m.

Publications

A full list of publications (approx. 180 in total) is available.