

Biographical Sketch - David A. Leigh (University of Manchester, UK; www.catenane.net)

Education and Employment Summary: David Leigh was born in Birmingham, England, on May 31, 1963. He received his BSc degree in Chemistry in 1984 from the University of Sheffield (UK) followed by a PhD from the same institution in 1987 for his work on crown ether analogues of trichothecenes under the supervision of Dr (now Sir) J. Fraser Stoddart. From 1987-1989 he was a postdoctoral fellow at the National Research Council of Canada in Ottawa, Canada, studying carbohydrate-protein interactions with Prof. David R. Bundle. In 1989 he returned to the UK as a Lecturer (Assistant Professor) at the University of Manchester Institute of Science and Technology (UMIST, since 2004 part of the University of Manchester). He moved to become Professor of Synthetic Chemistry at the University of Warwick (1998-2001) and then Forbes Chair of Organic Chemistry at the University of Edinburgh (2001-2012) before returning to Manchester in 2012 where he is now the Sir Samuel Hall Chair of Chemistry, the only named chair in the Department of Chemistry at the University of Manchester (UK), a historic center for the physical sciences (Dalton, Joule, Rutherford, Bragg, Perkin, Robinson, Haworth, Turing, Geim, etc). Since 2016 Leigh has been a Royal Society Research Professor, a position held by a small number of Fellows of the Royal Society, the UK's National Academy of Science and Letters. Since 2018 he is also a Distinguished Professor at East China Normal University, Shanghai. Leigh is a member of the ACS (since 1987), a Fellow of the Royal Society (FRS), a Fellow of the Royal Society of Edinburgh (FRSE) and a Fellow of the Royal Society of Chemistry (FRSC).

Research Area: Leigh is one of the pioneers of molecular nanotopology (molecular knots and links) and nonequilibrium molecular-level dynamics. Landmark examples from Leigh's laboratory include the first synthetic Brownian ratchets (2003) and nanomachines able to perform macroscopic work (2005), the invention of catalytic routes to rotaxanes, catenanes and knots ('active template synthesis'; 2006), and artificial small-molecule machines that, like motor proteins, 'walk' along tracks (2010). The Leigh group have developed molecular machinery with complex mechanisms of operation, including an acclaimed synthetic ribosome mimic (2013). In the past five years his group have reported the first examples of autonomous chemically fuelled molecular motors and pumps (2016, 2021, 2022), used knotting in a molecule to induce allosteric catalysis (2017), synthesized the most complex molecular knots to date (2017-2022), introduced the concepts of 'small-molecule robotics' (2016) and 2D molecular weaving (2020), and developed a programable 'molecular assembler' (2017).

Metrics (OrcidID orcid.org/0000-0002-1202-4507; GoogleScholar (GooSch) <https://goo.gl/RFvrGi>): Leigh has authored 310 publications to date, including *Nature* (10), *Science* (9), *Nat. Chem.* (10), *PNAS* (7), *JACS* (68) and *Angew. Chem.* (54). These have accrued >30000 citations, with an h index of 96 (GooSch 31 December 2021). More than one-in-four (93) publications have been cited more than 100 times each; six particularly highly-cited primary research papers more than 500 times each. Over the last decade, over half of Leigh publications have been highlighted in the scientific press or wider media. More than 33 (>1-in-10) of Leigh's primary research papers have been the subject of independent published perspectives ('*News & Views*' articles).

Public Engagement: Leigh is also known for his activities that merge art with science (video, music, magic, social media, traditional media, www, public lectures). 'Nanobot' [<https://bit.ly/2Qw8qRn>], a video he commissioned in 2018, generates >1M views per year across all video platforms. Social media show Leigh's videos being widely used by teachers in high schools [<https://bit.ly/36t1nyr>], in university courses [<https://bit.ly/2MXkzg0>], and by the general public. Leigh's molecular 8_{19} knot (*Science* 2017) appears in the Guinness Book of World Records as 'the world's tightest knot'; his molecularly-woven material (*Nature* 2020) holds the Guinness World Record for 'the finest woven fabric'.

Honors and Awards: The Leigh group's research contributions have been recognized with a number of scientific awards, including the Royal Society of Chemistry (RSC) Prizes for Supramolecular Chemistry (2003), Nanotechnology (2005) and the RSC Merck (2009), Tilden (2010), Pedler (2014) and Perkin (2017) Prizes, the Spanish Chemical Society (RSEQ) Prize for Chemistry (2007), the Institute of Chemistry of Ireland Award for Chemistry (2005), Feynman Prize for Nanotechnology (2007), the International Izatt-Christensen Award in Macrocyclic Chemistry (2007), the EU Descartes Prize for Transnational Research (2007), the ISNSCE (International Society for Nanoscale Science, Computation and Engineering) Nanoscience Prize (2019) and a Royal Medal from the Royal Society of Edinburgh (2021). Leigh is an honorary member of the Israel Chemical Society, a Clarivate Analytics Highly-Cited Researcher, and is listed in Academic Influence's 'Top Influential Chemists 2010-2020'.