

Fraser Stoddart / Biosketch 1000 Words

Fraser Stoddart (b 1942) received his BSc (1964) and PhD (1966) degrees from Edinburgh University. In 1967, he went to Queen's University (Canada) as a National Research Council Postdoctoral Fellow, and then, in 1970, to Sheffield University as an Imperial Chemical Industries (ICI) Research Fellow, before joining the academic staff as a Lecturer in Chemistry in the same year. He was a Science Research Council Senior Visiting Fellow at the University of California, Los Angeles (UCLA) in 1978. After spending a sabbatical (1978-81) at the ICI Corporate Laboratory in Runcorn, he returned to Sheffield where he was promoted to a Readership in 1982. He was awarded a DSc degree by Edinburgh in 1980 for his research into Stereochemistry Beyond the Molecule. In 1990, he took up the Chair of Organic Chemistry at Birmingham University and was Head of the School of Chemistry there (1993-97) before moving to the University of California, Los Angeles (UCLA) as the Saul Winstein Professor of Chemistry in 1997. In July 2002, he became the Acting Co-Director of the California NanoSystems Institute (CNSI). On May 1, 2003, he was appointed the Director of the CNSI and assumed the Fred Kavli Chair of NanoSystems Sciences. He stood down from the former on July 31, 2007 and relinquished the latter on December 31, 2007 in order to join the faculty at Northwestern University as a Board of Trustees Professor of Chemistry on January 1, 2008. On March 1, 2008, he was appointed an Emeritus Professor of Chemistry at UCLA. Since 2014, he has held an Honorary Professorship at the University of Nottingham.

Stoddart is one of the few chemists of the past quarter of a century to have created a new field of organic chemistry – namely, one in which the mechanical bond is a pre-eminent feature of molecular compounds. He has pioneered the development of the use of molecular recognition and self-assembly processes in template-directed protocols for the syntheses of two-state mechanically interlocked compounds, i.e., bistable catenanes and rotaxanes that have been employed as molecular switches in the fabrication of molecular electronic devices (MEDs) and NanoElectroMechanical Systems (NEMS) and in the development of artificial molecular machines (AMMs). It was for this research he was awarded the 2016 Nobel Prize in Chemistry for “the design and synthesis of molecular machines.”

His work has been recognized by many awards, including the Carbohydrate Chemistry Award of The Chemical Society (1978), the International Izatt-

Christensen Award in Macrocyclic Chemistry (1993), the American Chemical Society's Cope Scholar Award (1999), the Nagoya Gold Medal in Organic Chemistry (2004), the King Faisal International Prize in Science (2007), the Tetrahedron Prize for Creativity in Organic Chemistry (2007), the Albert Einstein World Award of Science (2007), the Foresight Nanotech Institute Feynman Prize in Nanotechnology (Experimental) (2007), the American Chemical Society's Cope Award (2008), and the Royal Society's Davy Medal (2008). He was one of ca. 20 research scientists to be invited by the Royal Swedish Academy of Sciences to participate in the Nobel Jubilee Symposium on "Frontiers of Molecular Sciences" in Stockholm in December 2001. In 2005, he received the Honorary Degree of Doctor of Science from Birmingham University, as well as being the recipient of the University of Edinburgh Alumnus of the Year 2005 Award. He received an Honorary Degree of Doctor of Science from the University of Twente (2006), Sheffield University (2008), Trinity College Dublin (2009), the University of St Andrews (2010), Nottingham University (2017), the Universidad Autonoma Madrid (2018), the University of Southern Denmark (2018) and the University of Brasilia (2019).

He is currently on the international advisory boards of numerous journals, including Chemistry World, ChemPlusChem, Macromolecular Rapid Communications and Organic Letters. He is editor-in-chief of Applied Nanoscience. He is a Fellow of the Royal Society (1994), the German Academy (Leopoldina) of Natural Sciences (1999), the American Association for the Advancement of Science (2005), and the Science Division of the Royal Netherlands Academy of Arts and Sciences (2006). He is a member of the American Academy of Arts and Sciences (2012) the National Academy of Sciences (2014), and the National Academy of Inventors (2020). He is an honorary fellow of the Royal Society of Edinburgh (2008) and the Royal Society of Chemistry (2011). He was appointed by Her Majesty Queen Elizabeth II as a Knight Bachelor in her 2007 New Year's Honours List for his services to chemistry and molecular nanotechnology. In 2010 he was the recipient of a Royal Medal, granted by Her Majesty Queen Elizabeth II, and presented by Prince Philip, Duke of Edinburgh, at the Royal Society of Edinburgh.

In addition to being made an Honorary Professor at the East China University of Science and Technology (2005) in Shanghai and Jilin University (2012) in Changchun as well as the Carnegie Centenary Visiting Professor at the Scottish Universities in 2005 and a World Class University (WCU) faculty at the Korea Institute of Science and Technology (KAIST) in 2011 and 2012, Stoddart is also

a Thousand Talent Scholar at Tianjin University (since 2014) and a Visting Professor at the University of New South Wales (since 2018). Stoddart has been awarded named lectureships by, inter alia, the following universities – Alberta, Alabama, SUNY Albany, Appalachian State, Arkansas, Australian National University, Baylor, Brigham Young, Berkeley, Bristol, Chicago, Columbia, Cornell, Dalhousie, Dartmouth, Dundee, Edinburgh, ETH Zurich, Georgia Institute of Technology, Hebrew Jerusalem, Illinois Institute of Technology, Iowa, John Innes Center, Hamilton, Kaiserslautern, Kansas, Karlsruhe, Louvain La Neuve, Manitoba, Meadville, McGill, Michigan, Minnesota, Missouri-St Louis, Montreal, Nevada, New Orleans, Notre Dame, Ohio State, Oklahoma, Pennsylvania, Purdue, Queen's Kingston, Regensburg, Rochester, Saskatoon, Simon-Fraser, Song Sil, Strasbourg, Stony Brook, Sydney, Texas Austin, Texas A&M, Texas Christian, Vanderbilt, Victoria, Wesleyan, West Florida, Western Ontario, Wichita State, Wisconsin, and Yale. He has also been Middle Rhine (1982), Troisième Cycle en Chimie (1988), and Atlantic Coast (1993) Lecturer. He went on Royal Society Lecture Tours of the USSR and Japan in 1986 and 1987, respectively.

Some measure of the influence and impact of Stoddart's work may be drawn from citation statistics. One of his >1200 publications has been cited over 2,000 times, 8 over 1,000, 15 over 750, 25 over 500, 74 over 250, 218 over 100, and 478 over 50. He has an h-index of 149. He has given >1,000 plenary/invited lectures. During 50 years, almost 500 PhD and postdoctoral students have passed through his laboratories and been inspired by his imagination and creativity, and close on 100 have subsequently embarked upon successful independent academic careers. For many years now, Stoddart has been included in the Thompson-Reuters / Clarivate Analytics List of Highly Cited Researchers in Chemistry.