



Curriculum Vitae Prof. Dr. Stuart Parkin

Name: Stuart Parkin
Born: 09 December 1955

Main areas of research: Spintronics, nanotechnology, giant magnetoresistance (GMR effect), storage media, computer hard disc drives, Racetrack Memory

Stuart Parkin is a British physicist whose main focus is the field of spintronics. When researching the interactions of thin material layers he discovered that the giant magnetoresistance (GMR effect) in many materials had practical applications. Parkin used this discovery to develop innovative read heads for computer hard disc drives and thereby made the high storage capacity of computers possible.

Academic and professional career

until 2015	Head of Magneto-electronics group, IBM Almaden Research Center, San Jose, California, USA
until 2015	Director, Spintronic Science and Applications Center (SpinAps), Stanford, USA
since 2014	Director and Scientific Member, Max Planck Institute of Microstructure Physics, Halle
since 2014	Alexander von Humboldt Professor, Martin-Luther-Universität Halle-Wittenberg Consulting Professor at Stanford University, USA
2009	Distinguished Visiting Professor, KAIST, South Korea
2008	Distinguished Visiting Professor, University of Eindhoven, Netherlands
2007	Distinguished Visiting Professor, National University of Singapore
2007	Research Professor at National Yunlin University of Science and Technology, Douliou, Taiwan
2007	Visiting Professor at National Taiwan University, Taiwan
2004 - 2006	Research at the Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen
1982 - 2014	Scientist at IBM Almaden Research Center, San Jose, California, USA

1982 IBM World Trade Fellow, IBM San Jose Research Laboratory, USA

1980 - 1981 Royal Society European Exchange Fellow, Laboratoire de Physique des Solides, Université Paris-Sud, France

1980 PhD, Cavendish Laboratory, UK

1979 Research Fellow, Trinity College, Cambridge, UK

1977 BSc in physics and theoretical physics, Cambridge University, UK

Studies of physics at Cambridge University, UK

Honours and awarded memberships

since 2015 Member, German National Academy of Sciences Leopoldina

2014 Millennium Technology Prize, Technology Academy Finland

2013 Honorary Doctorate, Technische Universität Kaiserslautern

2013 Swan Medal, Institute of Physics, London

2012 Honorary Fellow, Indian Academy of Sciences

2012 Fellow, World Academy of Sciences

2012 Von Hippel Award, Materials Research Society

2012 David Adler Lectureship Award, American Physical Society

2011 Honorary Doctorate, Universität Regensburg

2011 Fellow, Gutenberg-Forschungskolleg, Johannes Gutenberg-Universität Mainz

2009 IUPAP Magnetism Prize and Louis Neel Medal

2009 Dresden Barkhausen Award

2009 Fellow, American Academy of Arts and Sciences

2009 Honorary Professor, University College London, UK

2008 IEEE Daniel E. Noble Award

2008 Gutenberg Research Award

2008 Honorary Doctorate, Technical University Eindhoven, Netherlands

since 2008 Member, US-National Academy of Sciences

2007 Honorary Doctorate, RWTH Aachen

2004 Humboldt Research Prize

2000 Fellow, Royal Society, UK

1999 - 2000 Prize for Industrial Applications of Physics, American Institute of Physics (AIP)

since 1999 IBM Fellow

1997	Europhysics Prize for Outstanding Achievement in Solid State Physics
1994	International Prize for New Materials, American Physical Society
1991	Charles Vernon Boys Prize from the Institute of Physics, London
1991	MRS Outstanding Young Investigator Award

Main areas of research

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Stuart Parkin investigated extremely thin material layers like, for example, those used in computer chips in order to establish their storage capacity potential. He showed how the GMR effect (giant magnetoresistance) could be used in practical applications. Parkin utilized the spin of electrons in his work. Spintronics uses this tiny magnetic field that is present in every electron for processing and coding information. The GMR effect occurs in structures that consist of alternating layers of magnetic and non-magnetic material whereby an external magnetic field is able to influence the direction of electrons' spins and in this way change the electrical resistance of the stacked layers.

Parkin employed this effect in a sensor and developed a new type of read head for computer disc drives. Digital data can also be stored on hard drives in the form of microscopically small fields with different magnetisation directions. The read head has a sensor that, with the help of the magnetoresistance, can detect the direction of magnetisation. A read head with GMR effect is able to convert minute magnetic changes into sufficiently measurable distinctions in electrical resistance. Stuart Parkin's read head allowed the storage capacity of hard drives to be increased considerably. Nowadays practically every computer utilizes the giant magnetoresistance effect.

Parkin is currently involved in research focusing on energy-saving storage for the technologies of the future. He developed the "Racetrack Memory", a three-dimensional storage medium based on spintronics with an even higher degree of storage density. There are no longer any moving parts in this storage system. The data bits are stored on nanometre thin wires made of a magnetic material. The magnetic "domains" (structuring) are "pushed" back and forth within nanowire. In the future, Parkin also wants to develop switching circuits that function like the human brain, the circuits of which become stronger the more they are used.