Physicist Stuart Parkin wins 2014 Millennium Technology Prize for Opening Big Data Era

Technology Academy Finland

Technology Academy Finland (TAF) has declared innovator Prof. Stuart Parkin as winner of the 2014 Millennium Technology Prize, the prominent award for technological innovation. The winner, who follows in the footsteps of past winners such as World Wide Web creator Sir Tim Berners-Lee and ethical stem cell pioneer Dr. Shinya Yamanaka, will be honored at a ceremony in Helsinki, Finland, on Wednesday, May 7, 2014. The prize is worth one million euros.

Prof. Parkin receives the 2014 Millennium Technology Prize in recognition of his discoveries, which have enabled a thousand-fold increase in the storage capacity of magnetic disk drives. Parkin’s innovations have led to a huge expansion of data acquisition and storage capacities, which in turn have underpinned the evolution of large data centers and cloud services, social networks, music and film distribution online.

We can now stream movies, use social media and search information on the internet because all that information is stored in magnetic disk drives in the cloud. The information is stored in disk drives, because it is a cost-efficient means of storing data thanks to the spintronic device. Parkin cites estimates that a month’s supply of disk drives could easily store all the information known since the beginning of mankind.

Basically all this information is available in the cloud due to this little spintronic device that allows us to read it. Our contemporary online world is largely possible because of these atomically-thin magnetic structures.

Professor Parkin’s discoveries rely on magneto-resistive thin-film structures and the

development of the giant magnetoresistance (GMR) spin-valve read head. Following the discovery of GMR in 1988, Parkin rapidly transformed this scientific observation into a practical data storage technology.

Parkin is a leading innovator in the field of spintronics, which relies on the magnetic spin of electrons rather than their charge to store bits, and is one of the most successful fields of nanotechnology yet. Another key spintronics advance is magnetoresistive random-access memory (MRAM), which Parkin proposed in 1995. This technology is based on magnetic tunnel junction (MTJ) memory cells. The MTJ, a close cousin of the GMR spin valve, has become standard in hard disk drive read heads.

Prof. Parkin said:“I am extremely happy and excited to have won the Millennium Technology Prize because of course it’s one of the most important prizes in the scientific community. It has been awarded to some really great scientists over the past decade. The previous winners have proven to be fantastic scientists whose research has had tremendous impact. I am very humbled and proud to have been awarded the prize, which is s a tremendous validation by the scientific community of my work and its impact on the world as a whole.”

What the selection committee said about this year’s Winner:“Professor Stuart S.P. Parkin (Ph.D) is awarded the Millennium Technology Prize for his pioneering contribution to the science and application of spintronic materials, his work leading to a prodigious growth in the capacity to store digital information. Parkin’s achievements have greatly facilitated the occurrence of the ‘big data’ revolution and significantly transformed human access to knowledge.”

Dr. Tech. Juha Ylä-Jääski, President of Technology Academy Finland, said: “Technology Academy Finland is proud to be able to award the 2014 Millennium Technology Prize to Prof. Stuart S.P. Parkin and his innovations leading to a revolutionary growth in digital information storage capacity. Prof. Parkin’s innovations represent the true spirit and every aspect of the Millennium Technology Prize: groundbreaking innovations opening up possibilities to totally new services which address a large audience and improve the quality of life. Furthermore, in the future Prof. Parkin’s innovations may pave the way to a totally new era in computing with dramatically increased capacity and reduced power consumption.”

Stuart Parkin is an IBM Fellow, consulting professor at Stanford University, visiting professor at four other universities, Director of the Max Planck Institute of Microstructure Physics and Alexander von Humboldt Professor at Martin Luther University, Halle-Wittenberg.

The Millennium Technology Prize is Finland’s tribute to life-enhancing technological innovation. The prize is awarded every second year for a technological innovation that significantly improves the quality of people’s lives, today and in the future. It is awarded by the Technology Academy Finland (TAF), an independent foundation established by Finnish industry, in partnership with the Finnish state. The winner of the prize is selected by the Board of TAF on the basis of recommendations made by the International Selection Committee, a distinguished network of leading Finnish

and international scientists and technologists. The Grand Prize Winner will be honored at a festive ceremony in Helsinki on May 7, 2014.

Previous winners

The inaugural Prize was awarded in 2004 to Sir Tim Berners-Lee, inventor of the World Wide Web. In 2006, the Prize was awarded to Professor Shuji Nakamura, inventor of revolutionary new light sources — bright blue, green and white LEDs and a blue laser. In 2008, Professor Robert Langer won the Prize for his innovative work in controlled drug release and for developing innovative biomaterials for use in tissue regeneration. The fourth Prize was awarded to Professor Michael Grätzel in 2010 for his innovative developments in dye-sensitised solar cells. In 2012, Prizes were awarded to Linus Torvalds **i**n recognition of the unprejudiced creation of a new open source operating system leading to the widely-used Linux kernel and Dr. Shinya Yamanakain recognition of the discovery of a new method to produce induced pluripotent stem cells from ordinary cell tissue.

The recording of the announcement event will be available as of April 10 at http://www.youtube.com/user/millenniumprize [1]

Further information about the Millennium Technology Prize and members of the International Selection Committee can be found at**:** www.millenniumprize.fi [2]

Stuart Parkin videos online

https://www.youtube.com/watch?v=cID4fKraWkE [3]

http://online.kitp.ucsb.edu/online/plecture/sparkin13/rm/flashtv.html [4]

http://video.mit.edu/watch/tr10-racetrack-memory-545/ [5]

Partners of the Millennium Technology Prize

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Technology Academy Finland (TAF) is an independent foundation promoting innovations that improve the quality of people’s lives in a sustainable manner. TAF awards the biennial Millennium Technology Prize and runs associated events such as the Millennium Youth Camp. TAF also promotes Finland as a high tech, Nordic wellbeing country by actively participating in global networks within the scientific community, business and governmental organizations.

TAF incorporates the Finnish Academy of Technology, the Swedish Academy of Engineering Sciences in Finland and the Industry Council, which represents leading Finnish companies. One of TAF’s strengths is the tripartite cooperation between industry, governmental organizations and the scientific community and its extensive network in all these sectors. The three sectors are also represented in the TAF Board and the Executive Committee. Additional information about Technology Academy Finland can be found at:

www.taf.fi [6]

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[6] http://www.technologyacademy.fi