

## 2013 King Faisal International Prize for Science and Medicine

The King Faisal Foundation in Riyadh, Saudi Arabia announced that physicists Paul B. Corkum and Ferenc Krausz have jointly won the 2013 King Faisal International Prize (KFIP) for Science. They are recognized for their independent pioneering work which has made it possible to capture the incredibly fast motion of electrons in atoms and molecules with a time resolution down to attoseconds. The Prize for Medicine is awarded to Jeffrey Michael Friedman, USA and Douglas Leonard Coleman of USA–Canada, for their work on the genetics of obesity. The KFIP consists of a certificate, handwritten in Diwani calligraphy, summarizing the laureate's work; a commemorative 24 carat, 200 g gold medal uniquely cast for each winner, and a cash prize of Saudi Riyal 750,000 (about US\$ 200,000) to be shared equally. The winners will receive their awards in March in a ceremony in Riyadh under the auspices of the King of Saudi Arabia.

The KFIP is named after the third king of Saudi Arabia. In 1976, the sons of the late King Faisal (1906–75) established a large-scale philanthropic organization based in Riyadh, known as the King Faisal Foundation (KFF). One of the activities of KFF is to award KFIP, to honour scholars and scientists who have made the most significant advances to benefit humanity and enrich human knowledge. The annual prizes are given in five broad categories. Prizes for Arabic Literature, Islamic Studies and Services to Islam were first given in 1979. Science and Medicine were introduced in 1982 and 1983 respectively. Each year the selection committee designates subjects or subcategories to each of the above five. The science subcategory covers physics, mathematics, chemistry and biology by a rotation cycle of four years. For 2013, the science prize was given in physics. The previous physics prizes were given in 2005 and 2009 respectively. Over the past 35 years, a total of 49 scholars from 11 different countries have won the KFIP for science. This year's awards bring the total number of laureates to 223 from 40 different countries. Within three decades the KFIP is ranked among the most prestigious awards. Several of the KFIP Laureates in Science and Medicine have gone on to receive the Nobel Prize.

Paul Corkum is a Canadian physicist specializing in attosecond physics and laser science. He holds a joint University of Ottawa–NRC Chair in Attosecond Photonics. Corkum was born in Saint John, New Brunswick, Canada. He obtained his B Sc (1965) from Acadia University, Nova Scotia, Canada and his M Sc (1967) and Ph D (1972) in theoretical physics from Lehigh University, Pennsylvania, USA. Corkum started his career as a theoretical physicist, but became an experimentalist when he joined as post-doctoral fellow at NRC in 1973. When asked during an interview at NRC: 'what makes you think you can become an experimentalist?' he replied, 'it is no problem, I can take the engine of a car completely apart repair it and put it back together so it will work'. For more than 30 years, he has pushed the boundaries of human understanding of how light and matter interact. Among his awards are the Canadian Association of Physicists' Gold Medal for Lifetime Achievement in physics (1996), the Royal Society of Canada's Tory Award (2003), the Optical Societies Charles H. Townes Award (2005) and the IEEE's Quantum Electronics Award (2005). He was also awarded the American Physical Society's Arthur L. Schawlow prize for quantum electronics. In 2007, he was inducted as an Officer to the Order of Canada and received the prestigious John C. Polanyi Award from the Natural Sciences and Engineering Research Council of Canada in 2008. He is an elected member of the National Academy of Sciences, USA.

Ferenc Krausz was born in Hungary. He is a Hungarian–Austrian physicist, whose research team has generated and measured the first attosecond light pulse and used it for capturing the motion of electrons inside atoms, marking the birth of attophysics. He studied theoretical physics at Eötvös Loránd University, Budapest and electrical engineering at the Technical University of Budapest, Hungary. In 2003 he was appointed Director of the Max Planck Institute for Quantum Optics in Garching, Germany and in 2004 he became the Chair of experimental physics at the Ludwig Maximilians University in Munich, Germany. In 2006, he co-founded the Munich-Centre of Advanced Photonics

and began serving as one of its directors. After advancing femtosecond laser pulse generation and measurement to its ultimate limit set by the field oscillation cycle of light by a series of innovations, including the co-invention of chirped multilayer dielectric mirrors for dispersion control of ultrashort light pulses, Krausz and co-workers were the first to generate and measure an attosecond pulse in 2001. One year later, they demonstrated the ability of attosecond metrology to track sub-atomic-scale electron dynamics in real time. With controlled light waveforms, Krausz and his collaborators demonstrated steering electrons in and around atoms, with several far-reaching implications. These include attosecond pulse generation with reproducible characteristics, sampling the field oscillation of light with an attosecond oscilloscope, controlling chemical reactions via steering electrons in molecules with the field of light, and real-time observation of electron tunnelling from atoms and atomic-scale electron transport in solids. For these achievements, he received the Wittgenstein Award in Austria in 2002 and the Gottfried Wilhelm Leibniz Prize of the Deutsche Forschungsgemeinschaft in Germany in 2006. In 2010, his group reported the first real-time observation of valence electron motion.

The research findings of Jeffrey Friedman and Douglas Coleman led to the identification and characterization of the leptin pathway. This seminal discovery has had a major impact on the understanding of the biology of obesity, describing some of the key afferent pathways in body weight regulation active in humans. Their fundamental discoveries have also helped in the recognition of more illuminating views of the endocrine system.

The subjects for the 2014 KFIP for Science is mathematics and for medicine is non-invasive diagnosis of foetal diseases. The deadline for all nominations is Wednesday, 1 May 2013 (King Faisal Foundation Website: <http://www.kff.com/>).

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