

Prof Emmanuelle CHARPENTIER

Citation

How would you respond when you suddenly realize you are about to change the world and its future? When the email arrived from her students saying that a crucial experiment had been successful, microbiologist Prof Emmanuelle Charpentier, now world-renowned as one of the key innovators of the recent gene editing revolution, enjoyed a “very, very happy” moment of quiet triumph and joy. Then, with her usual focus and commitment, she sat down to send a reply on how to take the explorations further.

Prof Charpentier’s findings starting in the years 2006-2009 were related to the CRISPR-Cas9 bacterial immune system, on how it protects the bacteria from invading viruses, and the role of novel RNA-mediated regulation in this process. The new pathway they discovered and characterized set in motion a whirlwind of research and seminal publications from Prof Charpentier and her co-workers, leading to a much more straightforward and versatile genome engineering technology than was previously available, and opening up astounding opportunities in life sciences for gene manipulation and new therapies.

Variouly labeled “molecular scissors” or “a scalpel for researchers”, labs worldwide are now utilizing this methodology to “cut” and “paste” DNA sequences at precise sites in plants, animals and human cells. Start-ups have also burgeoned, including a company set up by Prof Charpentier,

Shaun Foy and Rodger Novak in 2013 to develop gene-editing based therapeutics for diseases such as cystic fibrosis and sickle cell disease, now known as CRISPR Therapeutics.

As a result, and still to turn 50, Prof Charpentier already has a “biotech discovery of the century” label attached to her work and a dizzying list of international honors and awards. She is a recipient of over 60 awards and honours. She was awarded among other prizes, the Breakthrough Prize in Life Sciences, the Gruber Foundation Genetics Prize, the Japan Prize, the Novozymes Prize, and five previous honorary doctorates. She is elected a member of numerous prestigious academic institutions, including a Foreign Member of the Royal Swedish Academy of Sciences and a Foreign Associate of the US National Academy of Sciences. She is also an awardee of the Chevalier Ordre de la Légion d’Honneur, the highest decoration in France. Such acclaim can be a heady experience but Prof Charpentier still remains totally dedicated to her long-held goal to advance medicine through fundamental scientific discovery. “The scientist that I am got me here and that is the scientist that I want to remain,” she noted in a previous interview.

She studied biochemistry, microbiology and genetics as an undergraduate at the University Pierre and Marie Curie and received a PhD in

Microbiology from the Pasteur Institute, both located in Paris. During six years in the US, she worked as a research associate at The Rockefeller University in New York and St Jude Children's Research Hospital in Tennessee, among others. Back in Europe, the intrepid explorer set up her own research group at the University of Vienna, before moving on to Umea University in Sweden, and Helmholtz Centre for Infection Research and Medical School of Hannover in Germany. Prof Charpentier is currently the Director of the Department of Regulation in Infection Biology at the Max Planck Institute for Infection Biology in Berlin, where her team is now exploring variations of the CRISPR-Cas system and what purposes they might herald, along with other aspects of bacterial physiology.

While dedicated to her work as a researcher, Prof Charpentier has not shied from recruiting her additional fame to serve wider goals. She has become a vocal and visible proponent of basic research as a key way to progress and innovation. She has spoken up on the need for ethical considerations related to the use of gene editing technology. She is keen to encourage younger researchers to enter the field; and HKUST was delighted when Prof Charpentier made her first trip to Hong Kong last year to take part in the University's 25th Anniversary Distinguished Speakers Series. She is also generously inclusive in her acknowledgement of the teamwork involved in her achievements. In all, a true example of the transformational inspiration of all-round excellence in both her dedication to science and approach to life.

Chancellor, on behalf of the Council of the Hong Kong University of Science and Technology, I have the high honor of presenting to you, Prof Emmanuelle Charpentier, Director of the Department of Infection Biology at the Max Planck Institute for Infection Biology, for the award of Doctor of Science *honoris causa*.