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The 2015 Mustafa(pbuh) Prize Laureates

The 2015 Mustafa(pbuh) Prize in Bio Nanotechnology was Awarded to

Jackie Y. Ying

For her outstanding contributions to the synthesis of well-designed advanced nanostructured materials and systems, nanostructured biomaterials and miniaturized bio-systems of various interesting applications including the development of "stimuli-responsive polymeric nanoparticles" for diabetic patients.

Nanostructured materials hold tremendous potential due to their unique size-dependent properties. For applications in numerous fields, these materials need to be designed and synthesized not only with the desired feature size, but also with the specific functionalities. Prof. Jackie Yi-Ru Ying's research has made a major impact in the field of nanostructured materials through major breakthrough in the synthesis of nanoparticles, nanocomposites and nanoporous materials. She has created a nano tool box that is successfully applied towards drug delivery, cell and tissue engineering, biosensors and diagnostics, pharmaceuticals synthesis, green chemistry and energy. Remarkably, besides her 340 publications in leading journals, she has over 150 primary patents issued or pending, many of which have been successfully licensed for commercialization.

Using the nano tool box, Prof. Ying has created new materials and systems that tackle the major challenges in different areas. For example, her laboratory has developed polymer nanoparticles that are capable of auto-regulating the release of insulin depending on the blood glucose levels. This invention bypasses the need for blood glucose monitoring by finger pricks, and allows insulin to be delivered orally or by nasal passage, instead of through injection. This technology would greatly benefit the diabetic patients by helping to prevent hyperglycemic and hypoglycemic episodes and the associated organ damages. Prof. Ying co-founded SmartCells, Inc. to commercialize this novel nanomedicine. This spin-off company was acquired by Merck in 2010, with potential aggregate payments in excess of $500 million to further develop the technology for clinical trials.

Prof. Ying was born in Taipei in 1966, and raised in Singapore and New York. She received her B.E. and Ph.D. from The Cooper Union and Princeton University, respectively. She joined the faculty at Massachusetts Institute of Technology in 1992, where she was Professor of Chemical Engineering until 2005. She has been the Founding Executive Director of the Institute of Bioengineering and Nanotechnology in Singapore since 2003. For her research on nanostructured materials, Prof. Ying has been recognized with the American Ceramic Society Ross C. Purdy Award, David and Lucile Packard Fellowship, Office of Naval Research Young Investigator Award, National Science Foundation Young Investigator Award, Camille Dreyfus Teacher-Scholar Award, American Chemical Society Faculty Fellowship Award in Solid-State Chemistry, Technology Review's Inaugural TR100 Young Innovator Award, American Institute of Chemical Engineers (AIChE) Allan P. Colburn Award, Singapore National Institute of Chemistry-BASF Award in Materials Chemistry, Wall Street Journal Asia's Asian Innovation Silver Award, International Union of Biochemistry and Molecular Biology Jubilee Medal, Materials Research Society Fellowship, Royal Society of Chemistry Fellowship, American Institute for Medical and Biological Engineering Fellowship, American Association for the Advancement of Science Fellowship, and Crown Prince Grand Prize in the Brunei Creative, Innovative Product and Technological Advancement (CIPTA) Award.

Prof. Ying was elected a World Economic Forum Young Global Leader, and a member of the German National Academy of Sciences, Leopoldina. She was named one of the "One Hundred Engineers of the Modern Era" by AIChE in its Centennial Celebration. She was selected by The Muslim 500 in 2012, 2013, 2014 and 2015 to be one of the world's 500 most influential Muslims. She was selected as an Inaugural Inductee for the Singapore Women's Hall of Fame in 2014. She is the Editor-in-Chief of Nano Today, which has an impact factor of 15.

The 2015 Mustafa(pbuh) Prize in Nanoscience and Nanotechnology was Awarded to

Omar M. Yaghi

For his outstanding contributions in designing and production of classes of compounds known as Metal-organic Frameworks (MOFs), Zeolite Imidazolate Frameworks (ZIFs)and Covalent Organic Frameworks (COFs)

The most useful materials made by humankind such as zeolites, polymers, pharmaceuticals, steel and concrete are composed either from organic or inorganic components. Prof. Yaghi has pioneered the field of making materials by linking both organic and inorganic units together by strong bonds into robust porous crystalline materials called nanoporous metal-organic frameworks (MOFs).These hybrid materials are useful in gas storage (hydrogen, methane, and carbon dioxide), hydrocarbon separations, catalysis, and more recently electronics. Prof. Yaghi developed this chemistry from the fundamental science all the way to applications. BASF is currently marketing his inventions as Basolites.

It has been a long-standing objective in chemistry to make materials by design. The challenge is that linking building units together into extended structures invariably lead to amorphous materials, which defied design. Yaghi's invention of MOFs turned this 'dream' into reality and made available a chemistry, which has led to the production of the most extensive class of materials ever made. The ability to fine-tune these materials nearly at will has made them important and to be widely practiced in over 1,000 academic and industrial laboratories worldwide. This has inspired legions of young scholars around the world to enter into chemistry and the research into new materials.

Prof. Omar Mwannes Yaghi is a Jordanian-American scientist who was born in Amman, Jordan in 1965. He received his B.S. degree from State University of New York-Albany (1985), and Ph.D. from the University of Illinois-Urbana (1990) with Professor Walter G. Klemperer. He was an NSF Postdoctoral Fellow at Harvard University (1990-92) with Professor Richard H. Holm. He has been on the faculties of Arizona State University (1992-98), University of Michigan (1999-2006), and UCLA (2007-2011). He is currently the James and Neeltje Tretter Chair Professor of Chemistry at UC Berkeley, and a Senior Faculty Scientist at Lawrence Berkeley National Laboratory. He is the Founding Director of the Berkeley Global Science Institute. He is also the Co-Director of the Kavli Energy NanoScience Institute, and the California Research Alliance by BASF. His early accomplishments in the design and synthesis of new materials have been honored by the Solid-State Chemistry Award of the American Chemical Society and Exxon Co. (1998) and the Sacconi Medal of the Italian Chemical Society (2004). His work on hydrogen storage was recognized by Popular Science Magazine which listed him among the 'Brilliant 10' scientists and engineers in USA (2006), and the US Department of Energy Hydrogen Program Award for outstanding contributions to hydrogen storage (2007). He was the sole recipient of the Materials Research Society Medal for pioneering work in the theory, design, synthesis and applications of metal-organic frameworks and the AAAS Newcomb Cleveland Prize for the best paper published in Science (2007). He is also the recipient of the American Chemical Society Chemistry of Materials Award (2009), Izatt-Christensen International Award (2009), United Kingdom's Royal Society of Chemistry Centenary Prize (2010), China Nano Award (2013), King Faisal International Prize in Science (2015). He holds over 10 distinguished professorships from universities in China, South Korea, Vietnam, Saudi Arabia and United Arab Emirates. Prof. Yaghi published over 200 articles, which have received an average of over 300 citations per paper. He is among the top five most highly cited chemists worldwide.