

## **HKSTAM Distinguished Seminar**

**(8 Aug 2017, the Hong Kong Polytechnic University)**

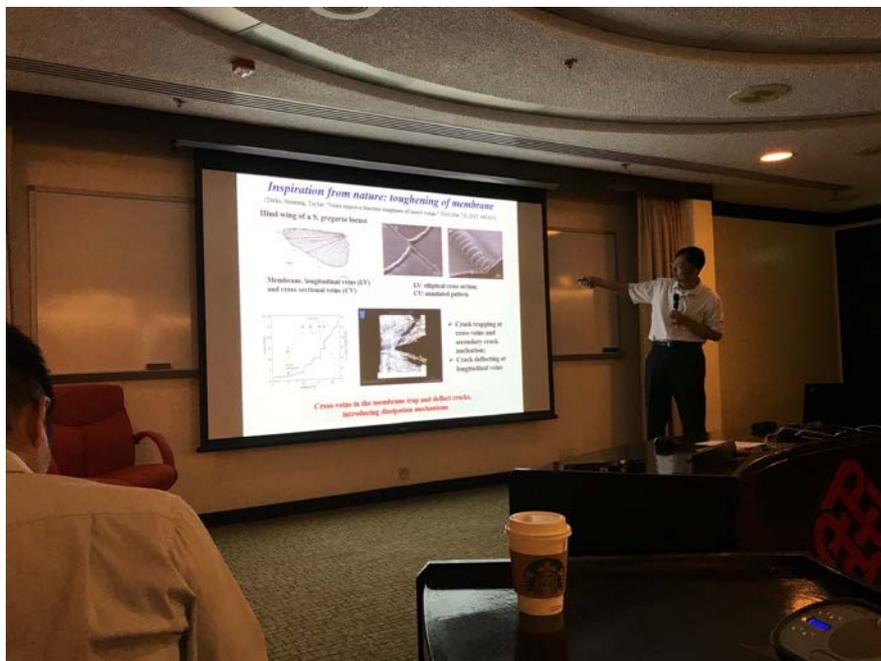
A “HKSTAM Distinguished Lecture” was co-organized by HKSTAM and the Department of Mechanical Engineering at the Hong Kong Polytechnic University (PolyU), in PolyU on 8<sup>th</sup> Aug 2017. At the seminar, Prof. Huajian Gao, from Brown University, the USA, Germany, delivered a talk titled “Topological Toughening of graphene and other 2D materials”.

Huajian Gao received his B.S. degree from Xian Jiaotong University of China in 1982, and his M.S. and Ph.D. degrees in Engineering Science from Harvard University in 1984 and 1988, respectively. He served on the faculty of Stanford University between 1988 and 2002, where he was promoted to Associate Professor with tenure in 1994 and to Full Professor in 2000. He served as a Director at the Max Planck Institute for Metals Research between 2001 and 2006 before joining the Faculty of Brown University in 2006. At present, he is the Walter H. Annenberg Professor of Engineering at Brown.

Professor Gao’s research is focused on the understanding of basic principles that control mechanical properties and behaviors of materials in both engineering and biological systems. He is a Member of the National Academy of Engineering (NAE), a Member of the Germany National Academy of Sciences Leopoldina, a Foreign Member of the Chinese Academy of Sciences (CAS) and the Editor-in-Chief of Journal of the Mechanics and Physics of Solids (JMPS), the flagship journal of his field. He is also the recipient of numerous academic honors, from a John Simon Guggenheim Fellowship in 1995 to recent honors including Rodney Hill Prize in Solid Mechanics from the International Union of Theoretical and Applied Mechanics in 2012, Prager Medal from Society of Engineering Science, Nadai Medal from American Society of Mechanical Engineers in 2015 and Theodor von Karman Medal from American Society of Civil Engineers in 2017.

Recently, the research group led by Prof. Gao has been exploring the potential use of topological effects to enhance the fracture toughness of graphene. For example, it has been shown that a sinusoidal graphene containing periodically distributed disclination quadrupoles can achieve a mode I fracture toughness nearly twice that of pristine graphene. In his talk, Prof. Gao reported the working progresses on further studies of topological toughening of graphene and other 2D materials. A phase field crystal method is adopted to generate the atomic coordinates of material with specific topological patterns. His group then performed molecular dynamics simulations of fracture in the designed samples, and observe a variety of toughening mechanisms, including crack tip blunting, crack trapping, ligament bridging, crack deflection and daughter crack initiation and coalescence.

At the end of the seminar, Prof. Li Cheng, the President of HKSTAM, presented a souvenir on behalf the Society, to Prof. Gao as a token of appreciation.



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21 Aug 2017