Research Highlight: A longstanding problem in algebraic geometry

Work of Professor ZHANG De-Qi

Common zero set M of polynomial functions is an algebraic manifold and the subject of study in algebraic geometry. In 1970, S. IITAKA defined its Kodaira dimension and Iitaka fibration M to a base by using global sections in some m-th tensor product of the cotangent line bundle of M for some large integer m. This Iitaka fibration is fundamental in classification theory due to the fact that its fibres and its base are simpler and better understood. Iitaka then asked whether one can choose the integer m to be a universal constant depending only on the dimension of M (and two natural invariants of the fibres). A positive answer would imply several important results for algebraic manifolds. Partial results were obtained by Iitaka and other renowned specialists. Recently, C. BIRHAR of Cambridge University and De-Qi ZHANG of NUS extended the Minimal Model Programme theory and answered Iitaka's question affirmatively in full generality.

Reference:
C. Birkar and D.Q. Zhang, "Effectivity of Iitaka fibrations and pluricanonical systems of polarized pairs". Publications Mathematiques de l"IHÉS, 123 (2016): 283-331.