2022 Kirkman Medal awarded to Ziqing Xiang

Ziqing Xiang has made significant contributions in several areas of combinatorics, namely, design theory, algebraic combinatorics, and graph theory. He also has done work in representation theory. Combining algebraic and number theoretic techniques with computer explorations, he has solved a number of longstanding open problems in design theory and algebraic combinatorics. For example, he solved Delsarte and Siedel's conjecture on a Fisher type lower bound for the size of relative t-wise balanced combinatorial designs. By considering the combinatorial properties of nontrivial tight 8-designs and developing a method to solve the related Diophantine equation, he succeeded in proving that there are no integral points on the curve associated with a nontrivial tight 8-design, hence proving the nonexistence of nontrivial tight 8-designs. Ziqing and his coauthors generalized Seymour and Zaslavsky's result on the existence of t-designs on a path-connected topological space equipped with good measure to the existence of t-designs on an algebraically path-connected space equipped with good measure. So far, he has published 9 papers in high quality general mathematics journals as well as in top quality specialized journals in combinatorics. He has frequently given seminar talks, and invited talks at national and international conferences.