MATH-IMS Joint Pure Mathematics Colloquium Series
The Chinese University of Hong Kong

This Colloquium Series in Pure Mathematics is organized by the Department of Mathematics and the Institute of Mathematical Sciences (IMS) at The Chinese University of Hong Kong. The series focuses on all areas of pure mathematics together with theoretical developments and applications.

Date: October 21, 2022 (Friday)
Time: 11:00AM-noon (Hong Kong Time)
Zoom Link: https://cuhk.zoom.us/j/98846779826

Steady Ricci solitons with positive curvature operators

Speaker: Professor Yi Lai
Stanford University

Abstract: Steady Ricci solitons are fundamental objects in the study of Ricci flow, as they are self-similar solutions and often arise as singularity models. Classical examples of steady solitons are the 2D cigar soliton (a.k.a. Witten's black hole), and the 3D rotational symmetric Bryant soliton and its generalization to higher dimensions. Hamilton conjectured that there exists a family of steady Ricci solitons in 3D called flying wings, which are "between" the 3D Bryant soliton and the product of a line and the 2D cigar soliton. In this talk, I will first discuss the construction of new families of steady gradient solitons with positive curvature operators in any dimension greater than or equal to three. This leads to the resolution of Hamilton's conjecture. Then I will discuss the symmetry of 3D steady Ricci solitons and show that they are all O(2)-symmetry.

Bio: Prof. Lai obtained her PhD at University of California Berkeley in 2021 under the supervision of Prof. Richard Bamler. After graduation, she was appointed as a Szego assistant professor at Stanford University. Prof. Lai's research interest broadly covers a variety of topics in geometric analysis especially on the theory of Ricci flows and Ricci solitons. She has made tremendous contributions in these areas, particularly on the classification problem of three dimensional Ricci soliton.