

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

*This MATH-IMS Joint 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 focus on all areas of pure mathematics together with theoretical developments and applications.*

**Date:** November 12, 2020 (Thursday)

**Time:** 4pm – 5pm (Hong Kong Time)

**Zoom Link:** <https://cuhk.zoom.us/j/98846779826>

**Smooth asymptotics for collapsing**  
**Calabi-Yau metrics**

***Speaker: Professor Hans-Joachim Hein***  
***University of Munster***

**Abstract:** Yau's solution of the Calabi conjecture provided the first nontrivial examples of Ricci-flat Riemannian metrics on compact manifolds. Attempts to understand the degeneration patterns of these metrics in families have revealed many remarkable phenomena over the years. I will review some aspects of this story and present recent joint work with Valentino Tosatti where we obtain a complete asymptotic expansion of the degenerating metrics in a natural class of examples. This relies on a new analytic method where each additional term of the expansion arises as the obstruction to proving a uniform bound on one additional derivative of the remainder.

**Bio:** Prof. Hein obtained his PhD at Princeton University in 2010. After that, he held research positions at Imperial College London and University of Nantes. From 2014 to 2016, Prof. Hein was an assistant professor at the University of Maryland, College Park. In 2016, he moved to Fordham University and later became the Kim B. and Stephen E. Bepler Chair professor in Mathematics. Prof. Hein is currently a professor at the mathematics institute of University of Münster. Prof. Hein's research interests include Riemannian and complex geometry; and he has done significant work in the study of Calabi-Yau metrics, complex Monge-Ampere equations and Ricci curvature.