One-day Workshop on Geometric Analysis in Kyoto

Date: May 13, 2026
Place: Room no 108, Department of Mathematics, Kyoto University
Speakers:
Florian Gruen (Kyoto University)
Katsuyuki Ishii (Kobe University)
Paul Minter (University of Cambridge)
Shunichiro Orikasa (Kyoto University)
Program:
10:00–10:50 Orikasa
11:10–12:00 Gruen
14:00–14:50 Minter
15:10–16:00 Ishii

Titles and abstracts:
Shunichiro Orikasa
Title: Scalar Curvature at Infinity via Dirac Operators and mu-Bubbles
Abstract: Following the work of Schoen–Yau and Gromov–Lawson, the relation between topology and positive scalar curvature (PSC) has been a central theme in geometric analysis. A key problem in the non-compact setting is how topology at infinity constrains scalar curvature. After a brief review of classical results, we present new results relating scalar curvature decay rates to the topology of ends. Combining mu-bubble methods with Dirac operator techniques on non-compact stable minimal hypersurfaces, we derive end-localized obstructions and curvature estimates.

Florian Gruen
Title: Some existence and regularity results for non-planar p-elasticae
Abstract: In this talk we introduce the p-elastica problem in R^n with arbitrary $p \in (1,\infty)$ and $n \geq 2$. In particular, p-elasticae arise as critical points to the p-bending energy, the L^p norm of the curvature, under a fixed length constraint. After some preliminary structure and regularity results (joint work with Tatsuya Miura), we show existence of closed non-planar p-elasticae and characterize them as torus knots. This generalizes classical results obtained by Langer--Singer for the quadratic case p=2 to general exponents p.

Paul Minter

Title: An optimal regularity theory for immersed stable minimal hypersurfaces

Abstract: I will discuss joint work with Zhengyi Xiao in which we study the optimal regularity and compactness question for properly immersed two-sided stable minimal hypersurfaces M^n. We prove that, if M is smoothly immersed outside a closed singular set S of vanishing (n-2)-dimensional Hausdorff measure, then in fact M is smoothly immersed away from a set of codimension at least 7.

Both the a priori size assumption on the singular set and its concluded size are optimal. This result extends the regularity and compactness theory of Schoen—Simon from embeddings to (two-sided) immersions, as well as recent work of Bellettini and Hong—Li—Wang, the latter proving the result instead assuming the Hausdorff dimension of S was strictly less than n-4+4/n. Our proof, unlike the intrinsic PDE approach of Bellettini and Hong—Li—Wang, utilises ideas from geometric measure theory.

Katsuyuki Ishii

Title: A thereshold-type algorhtim for fourth order geometric motions

Abstarct : In this talk, we are concerned with a numerical algorithm for the motion of hypersurfaces/curves by the fourth order geometric equations such as the Willmore flow equation.　The algorithm we introduce here was first proposed by Bence, Merriman and Osher in 1991 to numerically compute mean curvature flows. Our algorithm is an application of theirs and we use the fourth order heat equation instead of the second order one.　We present the asymptotic expansion of the solution for the fourth order heat quation and the consistency result. This talk is based on my joint work with Professors Y. Kohsaka (Kobe U.), N. Miyake (Kyushu U.) and K. Sakakibara　(Kanazawa U. & RIKEN).

Organizers:

Tsuyoshi Kato, Keisuke Takasao (Kyoto University)

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