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Barcelona Analysis Seminar **2026–2027**

Date: Thursday October 22, 2026
Time: 15:00 CET
Room: UB iA (Universitat de Barcelona)

Sharp Spectral Gap Estimates under Integral Ricci Curvature Bounds

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A central problem in geometric analysis is to obtain uniform estimates for Laplacian eigenvalues across large classes of Riemannian manifolds. Such estimates depend only on limited geometric information, rather than detailed knowledge of the metric. Classical results show that lower bounds on the Ricci curvature and upper bounds on the diameter yield sharp lower bounds for the first nonzero eigenvalue of the Laplace-Beltrami operator.

In this talk, I will present joint work with Shoo Seto and Malik Tuerkoen extending the estimates of Kröger and Bakry–Qian to integral Ricci curvature bounds, which allow curvature to fall below a prescribed threshold provided the curvature deficit below the threshold is sufficiently small in an Lp sense. Our estimates approach the sharp classical bound as this deficit tends to zero, and they apply uniformly to a much larger class of manifolds. After introducing the spectral problem in its classical form, we will discuss the proof technique with a special focus on how we are able to remove the pointwise lower bound assumption on the curvature.