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Xiaolong Han* (xiaolong.han@csun.edu), Department of Mathematics, California State University, 18111 Nordhoff Street, Northridge, CA 91330. *Global harmonic analysis on compact manifolds.*

Harmonic analysis is the study of the basic harmonics and representation of functions and operators as superpositions of these harmonics. For example, on the torus, the harmonics are Fourier modes and appropriate functions can be written as Fourier series. On general compact manifolds, the harmonics are Laplacian eigenfunctions and they form an orthonormal basis. The analysis of Laplacian eigenfunctions has close relation to geometry of the manifold, particularly its global geometric structure (e.g. symmetry of the torus); global harmonic analysis is the study of the relation between the Laplacian analysis and global geometric structure of the manifold.

I will talk about global harmonic analysis on different manifolds: spheres (positive curvature), tori (zero curvature), and negatively curved manifolds (negative curvature). In each case, we will see how global symmetry, probability, or dynamics of geodesic flow has impact on the oscillation of Laplacian eigenfunctions. We will also apply the analysis of Laplacian eigenfunctions to some other areas and propose future research directions in global harmonic analysis. (Received August 31, 2016)