

Mentor Lecture Series

Organizer(s): Shaowei Lin & Diogo Oliveira e Silva

Monday, 4:10–5:00pm, 60 Evans

Oct. 29 **Michael Christ, UCB**

Fourier analysis outside dimension one

Fourier analysis is an ancient and intensively developed subject. However, there are fundamental differences between the one-dimensional case, and higher dimensions. Certain foundational questions were crystallized around 1970, and the two dimensional case was resolved, but the higher-dimensional case remained mysterious. In the ensuing decades, connections with phenomena in Euclidean geometry, combinatorics, and partial differential equations have emerged. Partial results have been obtained, with crucial contributions by Stein, Carleson, Fefferman, Hörmander, Bourgain, Wolff, Gowers, Tao and others. Nonetheless, the fundamental questions remain wide open in dimensions three and higher.

I will attempt to explain what some of these questions ask, to indicate why they are natural, and to indicate how they are connected.

The Mentor Lecture Series is designed for first and second year graduate students. The series aims to acquaint beginning graduate students with potential dissertation supervisors whom they might not otherwise closely encounter, and to impart a taste of research activity in the mathematics department in order to help beginning students choose fields of specialization.