LUMS
A Not-for-Profit University

Seminar Title

“Fourier meets Riemann: some problems on the interface between analysis and number theory."

Speaker: Prof. Emanuel Carneiro (ICTP, Italy)



Date/Time: Monday September 06, 2021

4:00 PM - 5:00 PM

Abstract

The field of harmonic analysis aims to understand, qualitatively and quantitatively, the several types of oscillatory phenomena in nature. The Fourier transform (*après* the work of Jean-Baptiste Joseph Fourier 1768 - 1830) is one of the main mathematical tools we have for that. The field of analytic number theory, as the name suggests, uses tools from analysis to understand different types of problems in number theory. One of the central objects therein is the Riemann zeta-function, a beautiful bridge between the prime numbers and complex analysis, presented in the celebrated work of Bernhard Riemann in November, 1859. In this work, Riemann proposes what would later become, for many, the Holy Grail of modern mathematics: the Riemann hypothesis. Having lived from 1826 to 1866, Riemann probably never met Fourier in person, and in this lecture I will speculate a bit around some themes they could talk about, i.e. some problems that lie on the interface between

harmonic analysis and analytic number theory. And of course, tell a story or two about the Riemann hypothesis, on the occasion of its 162th birthday this coming November. The lecture will be aimed to a broad audience, with only a minimal background in analysis.