

**PhD research topic proposal**  
**BME, Doctoral School of Mathematics and Computer Science**

**Name of supervisor :**

**Máté Matolcsi**

**Degree:**

**DSc**

**Title of the topic:**

Selected applications of Fourier analysis

**Short description:**

The Delsarte LP-bound has been applied with success in various branches of mathematics, most notably in the density problem of sphere packings in dimensions 8 and 24 in recent years.

During the PhD course we will learn the Fourier-analytic formulation of the method, review some of the well-known applications, and try to achieve new results in some selected problems related to it. In particular, possible areas of research include: density of packings and distance-avoiding sets, the problem of mutually unbiased bases (MUBs), and properties of spectral sets and tiles.

**Requirements:**

Adequate command of English language, basic knowledge of Fourier analysis, good skills in problem solving skills

**Contact:**

**Phone:**

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**Place of work:**

BME, Institute of Mathematics, Department of Analysis

**Statement:** *The conditions of the research above are satisfied, the theme is confirmed by the Head of the Department/Institute*