

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

**Name of supervisor :**

**Károly Simon**

**Degree:**

**DSc**

**Title of the topic:**

**Dimension theory of non-Markovian attractors and non-linear hyperbolic sets**

**Short description:**

This topic is a combination of Chaos Theory and the Fractal geometry. We consider dynamically defined Cantor sets in the  $d$ -dimensional Euclidean space. These sets are obtained as an infinite process of iteration of some self maps of the  $d$ -dimensional space like we obtain the triadic Cantor set on the line. They are the attractors or repellers of chaotic dynamical systems. One of the most important characteristic of such a set is its Hausdorff dimension. In recent years there have been very intensive development about the study of dimension theory of hyperbolic invariant sets. We would like to make progress along the following two problems: On the one hand we consider partially hyperbolic maps where the dynamics cannot be described by a shift of finite type. On the other hand, we study the repeller of none-piecewise systems. This research topic requires knowledge of geometric measure theory and the theory of dynamical systems. In our department there is a very strong research group on both fields and we have a number of courses regularly which provide very good opportunity for the prospective Ph.D. student to learn any of these fields. It is not a requirement that the student knows deeply any of these fields when he or she starts the Ph.D. studies.

**Requirements:**

Basic knowledge in measure theory, topology and dynamical systems

**Contact:**

**Phone:**

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**E-mail:**

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**Place of work:**

Department of Stochastics, Institute of Mathematics, BME

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