Abstract:
It is a classical result that the first eigenvalue of the Dirichlet Laplacian amongst domains of fixed measure is minimal for the ball. For the second eigenvalue it is known that two disjoint balls of equal measure realize the minimum. For higher eigenvalues little is known.

In this talk we will consider a number of problems related to the following question: Does the behaviour of domains minimizing the k-th eigenvalue stabilize as k becomes large? In particular, we shall discuss the problem of maximizing

$$\text{Tr}(-\Delta\Omega - \lambda)^\gamma = \sum_{k \geq 1} (\lambda - \lambda_k(\Omega))^\gamma,$$

for $\gamma \geq 0$ amongst domains $\Omega \subset \mathbb{R}^n$ of fixed measure.