

UNIVERSITAT DE BARCELONA



UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

Barcelona Analysis Seminar	2022 - 2023	
URL. https://mat.uab.cat/web/semina	arianalisi/	
<b>Date.</b> June 01, 2023		
<b>Time.</b> 15:00 CET		
Room. CRM A1 (Universitat Autònoma	de Barcelona)	
<b>Online streaming.</b> Click here to join.		

## Carleson's $\epsilon^2$ -conjecture in higher dimensions, the Alt-Caffareli-Friedman formula, and Faber-Krahn inequalities

Xavier Tolsa

Universitat Autònoma de Barcelona

In this talk I will report on a recent work with Ian Fleschler and Michele Villa where we extend the  $\epsilon^2$ -conjecture of Carleson about the characterization of tangent points for Jordan domains in the plane to the higher dimensional setting. The generalization that we obtain does not require any connectivity condition for the domains under consideration, and so it is new even in dimension 2. I will also explain interesting connections with the Alt-Caffarelli-Friedman monotonicity formula and with the so-called Faber-Krahn inequalities that quantify the size of the first eigenvalue of the Dirichlet Laplacian on a given domain. In fact, one of the ingredients of our work is the obtention of new Faber-Krahn inequalities which measure the deviation of a given domain from a ball with the same measure in terms of Newtonian or logarithmic capacities.