Einladung

Würzburger Mathematisches Kolloquium

Julius-Maximilians-Universität Würzburg • Institut für Mathematik

Patricia Alonso Ruiz

Friedrich-Schiller-Universität Jena

Could Brownian Motion Measure Perimeter in a Fractal World?

Dienstag, 15. Juli 2025 • 14:15 Uhr

Seminarraum SE41 • Humboldt-Bau (Emil-Fischer-Straße 41, 97074 Würzburg)

Der Vortrag wird auch als Zoom-Meeting übertragen: go.uniwue.de/ifmcolloquium-zoom

Abstract. Walking with a friend along the seashore you find a sponge lying on the sand. Pointing at it, you say to your friend: 'See how porous this sponge is! It is full of tiny holes.' Your friend is also excited: 'Yes indeed! To me, its structure looks quite fractal.'

You further wonder out laud: 'Imagine that someone cuts a thin slice of it. How could one measure the area of the slice?' Your friend, who accidentally this semester is attending a course in fractal geometry, replies: 'One could try to do it using a suitable Hausdorff measure'. Intrigued by such an answer you ask your friend: 'What about measuring the perimeter of the slice?' Your friend exclaims: 'Interesting question, I didn't think about it before!'

In this talk we will address that question and revisit a beautiful connection between Brownian motion, bounded variation (BV) measures and the perimeter of sets. Guided by the work of Cacciopoli, de Giorgi, and Ledoux, we will first review that relation in the Euclidean setting. From there, we will explore what happens when we move toward a more fractal-like world.