

25th October 2018, 17:30
Seminar Room, BCAM

What is a fractal?

Daniel Eceizabarrena (BCAM)

Fractals have been around for the last 150 years, but classified as strange and pathological objects (*monsters*, they called them) most of the time since their discovery. People not being able to represent them graphically by hand, they were wanderers in a world which had not known computers yet.

Benoit Mandelbrot, the biggest name in the discipline, regarded them as a perfect example of the *Nomen est numen* principle: everything is unknown until it is given a name. He consequently coined the term *fractal*, wrote *The fractal geometry of nature* in 1977 and popularised them, so much that we all know about the term now.

In this talk, we will review some history and the definition of fractals and we will go through Mandelbrot's *How long is the coast of Britain?* article to understand the intuition behind the concept of fractal dimension. We will also discuss the precise definition of the Hausdorff dimension, present a classical result on self-similar fractals and show a few examples.

$$\mathcal{H}^s(A) + \sum_{i=1}^n \mathcal{H}^s(z_i + \delta_i A)$$
$$\mathcal{H}^s(A) \leq \sum_{i=1}^n \delta_i^{s-d} \mathcal{H}^s(z_i + \delta_i A)$$