

Maryam Mirzakhani Seminar Room, BCAM
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What is a space?

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In this talk, I will discuss different notions of space beyond classical topological spaces. It was back in the 1920's when it was first observed that most of the topological information is contained within the open sets, and therefore, it can be argued that points play a secondary role in Topology. Eventually, this idea led to what we now know as 'locales' or 'pointless spaces', topological spaces which may not have enough points.

A further generalization of these 'pointless spaces' is the categorical notion of Grothendieck topos, a kind of generalized space which may lack (not only points but also) opens. These categories have been of huge importance in many different areas, for example in Algebraic Geometry.

In the talk, I will informally introduce those generalizations. A natural question is whether those very generalized structures still deserve being called spaces, and I will try to explain why this is indeed the case and we will explore their connection with classical topology. I also want to emphasize some of the various advantages these generalized spaces have for the working mathematician: the point of pointless topology. No prior knowledge is required but I shall freely use words such as "category", "functor"...

$$H^1(A) + (z^n - H^1(A))(z - \delta_1)^A$$
$$H^1(A) < \dots \delta_1 z^n + \delta_2$$