On the geometry of arc and jet spaces

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The arc and jet schemes of a variety X reflect the geometry of X_{sing} and its invariants, as had been shown in the works of Nash, Ishii, Kollar, Mustata, Reguera, but not much is known about their geometry. On the arc space one has also an analytic tool, the motivic integral (Kontsevich, Denef, Loeser), which encodes topological information about X, but could be applied for problems in representation theory also. In this talk I will try to demonstrate some of the most interesting and powerful results obtained mainly in the first direction, and will discuss some problems, like Nash problem, with their recent developement.