Hussein Mourtada: Arc spaces and Rogers-Ramanujan identities.

The space of arcs centered at point x of a variety (or a scheme) X is the space which parameterizes germs of curves drawn on X and centered at x. It naturally has a cone structure or equivalently its algebra A is graded. This allows to define a new invariant of singularities that measures the vector space dimension of the homogeneous components of A and that we call: The Arc Hilbert Poincaré series. We will describe this invariant and compute it in some simple cases (smooth varieties, rational double point singularities, normal crossing divisors). When X is the double point $\mathrm{Spec}(k[y]/y^2)$, the result is surprising: our series is the series that appears in the first identity of the Rogers-Ramanujan Identities; these are magical identities which make intervene integer partitions. We will explain what are these identities and the relation to our invariant.

This is joint work with Clemens Bruschek an Jan Schepers.