# ODTU-Bilkent Algebraic Geometry

# "Formal Moduli Problems and Classical Field Theories"

**BY**

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**(ODTÜ)**

**Abstract:** This is an introductory talk to the concept of a formal moduli problem in sense of Lurie and it's essential role in encoding the formal geometric aspects of derived moduli spaces of solutions to the certain moduli problems. To be more specific, we shall be interested in a sort of formal moduli problem describing a classical field theory on a base manifold M in the sense that it defines a derived moduli space of solutions to the certain differential equations on an open subset U of M, namely the Euler-Lagrange equations, arising from a local action functional defined on the space of fields on U, see Costello and Gwilliam. The outline of this talk is as follows:
*(i)* we shall first revisit the main aspects of the standard moduli theory in a functorial way, and then
*(ii)* a number of concepts naturally appearing in the context of derived algebraic geometry, such as simplicial sets, commutative differential graded algebras, derived stacks, differential graded Lie algebras and $L_\infty$ algebras, etc..., are introduced in a rather succinct and naïve way in order to describe the notion of a formal moduli problem and enjoy its properties. Having established enough formal language,
*(iii)* we shall present a key theorem of Lurie, which allows us to study formal moduli problems in an unexpectedly concrete fashion, and then we also provide a kind of a recipe to motivate constructions encoding the derived re-interpretation of a classical field theory together with some examples, see Costello and Gwilliam.

**Date:** 11 October 2019, Friday
**Time:** 15:40 +
**Place:** Mathematics Seminar Room, SA- 141
Tea and cookie will be served before the talk. You are most cordially invited.