

# Student Research Talks (StReeTs)

George Mason University

## Formal Schemes, Groups

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### Abstract

In algebraic geometry, schemes capture algebraic data through geometrical means in analogy with the study of manifolds or analytic spaces such as complex varieties. This analogy has its limits, however, since nilpotents in the sheaf of regular functions can't be captured by means of functions on the scheme as a space. Viewed a different way, this allows us to consider infinitesimals in algebraic geometry that aren't easily accessible through the theory of varieties. In particular, for an embedding of varieties we can consider infinitesimal thickenings of the embedding; taking all of these thickenings as data we come to the notion of the formal neighborhood of the subvariety. This naturally leads to the notion of a formal scheme, which is "something in between a subvariety and an ambient variety" according to Robin Hartshorne.

An important (to algebraic topologists, anyway) example is the formal scheme associated to the identity of a group scheme which, for reasons I will go over in this talk, we call the formal group associated to the group scheme. The purpose of this talk is to give enough of the background of formal schemes and groups to give examples and perhaps even a glimpse of some moduli stacks of great import to algebraic topologists.

Date: Friday, February 9th

Time: 2:30pm–3:20pm

Place: Exploratory Hall 4106

**Pizza will be served at the presentation.**

For further information or for special accommodations (including dietary restrictions), please contact Michael Merkle or Gabe Lumpkin via email at [mmerkle@gmu.edu](mailto:mmerkle@gmu.edu) or [glumpkin@gmu.edu](mailto:glumpkin@gmu.edu) by Thursday.