

# Ben Singer '27

REU at the University of Michigan  
Summer 2026

This summer, I used Byrne scholarship funding to participate in the REU at the University of Michigan. Throughout the REU, I worked on a project developing new theories of (derived) complex analytic and archimedean dagger analytic spaces. My work is a part of a large overhaul of analytic geometry spurred by deep questions in the Langlands program that has taken place over the last decade. In particular, it builds on a recent new approach developed by Ben-Bassat–Kelly–Kremlnizer realizing the rings governing the local geometry of various analytic theories as an application of an abstract formalization of the “functor of points” approach to derived algebraic geometry (a theory they call relative geometry tuples associated to derived algebraic contexts). The REU was an incredible experience and a great opportunity to learn and use several very deep concepts in modern mathematics, such as higher category theory, higher topos theory, higher algebra, derived algebraic geometry, condensed mathematics, advanced functional analysis, and six-functor formalisms. In the end, I wrote an over 100-page monograph that is half exposition and half original work, proving several new results. I also gave a talk on my work and will likely speak about it at Dartmouth’s algebra and number theory seminar later this year as well. After I apply to graduate school, my mentor and I will work to tie up some loose ends and turn my work into a preprint (and hopefully, a published article later on).

I would like to thank the Byrne scholars program for funding my travel, housing, and groceries throughout the program. Though the project is motivated by similar questions to my usual work at Dartmouth, the mathematics behind it is quite different from the mathematics that Dartmouth’s algebraic and arithmetic geometry group focuses on. Getting to learn it and use it has broadened my mathematical horizons immensely. I would not have been able to have this experience without the support of the Byrne scholars program!