Juan Serratos

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Citizenship: United States & Mexico

Education

University of Southern California — Los Angeles, CA
MA in Mathematics — May, 2025

University of Southern California — Los Angeles, CA
BA with honors in Mathematics — December, 2024

Research experience

Number Theory REU, Occidental College — May – Aug. 2023
A 10-week summer research project on number theory, focusing on the arithmetic structures on graphs, at Occidental College, Los Angeles. Funded by NSA (and NSF).
With Jim Brown

Directed Research, USC — Aug. – Dec. 2022
Studied modern algebraic geometry under the guidance of Aravind Asok that is required for the Weil Conjectures and étale cohomology. Participated in *Math 614: Topics in Algebraic Geometry: Algebraic Groups and Actions* at USC, a graduate course on algebraic geometry, mainly using *Introduction to Algebraic Geometry and Algebraic Groups* by Michel Demazure. Wrote eleven pages of the course notes that will be used for later classes. Finished with an independent thesis-like paper written throughout the months leading up to December.
With Aravind Asok

Undergraduate Research Project, USC — Feb. – May 2023
Reading project on p-adic numbers, adic spaces, formal schemes, and perfectoid spaces, progressing through Scholze and Weinstein's *Berkeley Lectures on p-adic Geometry*. Conducted independent research on $\operatorname{Spec}\mathbb{Z}_p[T]$, resulting in a descriptive depiction analogous to Mumford's $\operatorname{Spec}\mathbb{Z}[T]$.

Undergraduate Research Project, USC — Aug. – Dec. 2022
Focused on reading and progressing through Milne's *Lectures on Étale Cohomology* and unsorted papers found online in a similar context.
With Tianle Liu

Undergraduate Research Project, USC — Jan. – May 2022
Participated in an undergraduate departmental reading project—we are paired up with graduate mentors to source and study a chosen math topic. Mainly learned the basics of scheme theory via Hartshorne's *Algebraic Geometry* and Vakil's *The Rising Sea: Foundations of Algebraic Geometry*.

With Wenhan Jiang

Papers

"On the prime spectrum of the p-adic integer polynomial ring with a depiction"
arXiv: 2304.03523
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"Baby Steps Towards Étale Cohomology."
Juan Serratos.

Seminar Talks

Étale Cohomology, as motivated by the Weil Conjectures Dec. 2022
University of Southern California

Arithmetic Schemes: David Mumford's depiction of $\operatorname{Spec} \mathbb{Z}[T]$ May. 2022
University of Southern California