REU: MATHEMATICAL SCIENCES & THEIR APPLICATIONS
TEXAS A&M UNIVERSITY: May 27 – July 18, 2025⋆

Want to learn what mathematical research is about? If you are an undergrad looking for a summer research opportunity then consider our 4 programs at Texas A&M: We provide an intense 8-week research experience, subsidized travel (typically full reimbursement within the US & territories), free housing, and a stipend. Further details below...

Algorithmic Algebraic Geometry, mentored by J. Maurice Rojas

Complexity theory has developed new methods to reduce central problems (such as **P** vs. **NP**) to studying the solutions of structured polynomial systems. We'll pursue an accessible introduction to the intersection of polynomial system solving and algorithmic complexity. Students will become familiar with advanced tools for large-scale non-linear equation solving such as tropical geometry, $\mathcal{A}$-discriminants, and fewnomial theory.

Semi-Algebraic Geometry in Schrödinger Equations, mentored by Wencai Liu

Anderson localization demonstrates how impurities and imperfections in a material can obstruct electrical conductivity. Students in this new stream will explore the long-time behavior of solutions to the non-linear Anderson model, using techniques like multiscale analysis and the Craig-Wayne-Bourgain (CWB) approach, with applications to disordered systems and wave dynamics.

Algebraic Methods in Computational Biology, mentored by Anne Shiu

How does one determine the wiring of neurons in the brain without surgery? How can one use algebraic geometry to understand the non-linearities in differential equations governing biochemical reaction networks? Can this help us predict immune response to vaccination? We pursue these questions after a rapid introduction to the necessary background on chemical reaction networks and algorithms for polynomial systems solving.

Knot Theory, mentored by Sherry Gong

Knots are one of the central objects of study in low dimensional topology. This new stream introduces some algebraic, geometric, and gauge-theoretic invariants used to study knot concordance and genus. Students will learn about the computations of these invariants and their consequences for knot concordance, as well as how they relate to the smooth 4-dimensional Poincaré Conjecture, one of the most important questions in 4-manifold topology.

⋆ Pending renewal of our NSF REU site grant DMS-2150094.