Isik Ulusan

Amherst, MA — iulusan [at] umass [dot] edu — Website

Education

University of Massachusetts Amherst Amherst, MA
B.S. in Computer Science and B.S. in Mathematics Expected May 2027
GPA: 4.0/4.0; Commonwealth Honors College
Honors: Dean's List; Chancellor's Award
Selected Coursework: Complexity Theory, Formal Language Theory, Advanced Algorithms, Theory of Computation, Abstract Algebra, Linear Algebra.

Research Interests

Interactive Proof Systems; Zero-Knowledge Proofs; Metacomplexity; Circuit Complexity

Research Experience

Commonwealth Honors College Honors Thesis Amherst, MA
Annotated data streams, arithmetization, low-degree extensions December 2025 – Present

- Investigating arithmetization schemes for annotated data streams using low-degree extensions under the advising of Andrew McGregor.
- Analyzing existing annotated data stream schemes and how they extend to more general versions of the underlying problems.
- Applying Chinese remainder methods toward improved schemes for frequency-based functions in annotated data streams.

UMass Mathematics REU Amherst, MA
Mirror symmetry, ordinary double points, toric geometry June 2026 – August 2026

- Studied mirror symmetry with Jack Ronneberg under the guidance of Paul Hacking to count ordinary double points (ODPs) of algebraic varieties.
- Developed a program to compute flops of varieties using toric fans.
- Investigated additional conditions required to obtain all ODPs in the mirror construction.

UMass Mathematics Directed Reading Program Amherst, MA
Elliptic curve cryptography and cryptanalytic attacks September 2025 – December 2025

- Studied elliptic curve cryptography (ECC), algorithms for elliptic-curve operations, and mathematical proofs of attacks against ECC with a Ph.D. student mentor.
- Examined Smart's attack on cryptosystems using anomalous elliptic curves and the mathematics underlying the attack.

Research Presentations

Ordinary Double Points through Mirror Symmetry 2026
UMass Mathematics REU; presented to participants and mentors

Descriptive Complexity Characterizations 2026
COMPSCI 613; presented to students

Elliptic Curve Cryptography and Smart's Attack 2025
UMass Mathematics Directed Reading Program; presented to mentees and Ph.D. mentors

Teaching Experience

COMPSCI 311 – Introduction to Algorithms Amherst, MA
Head Undergraduate Course Assistant, University of Massachusetts Amherst September 2026 – Present

- Leading a weekly discussion section and holding office hours by presenting the problems and answering student questions.
- Managing and helping 4 UCAs by holding weekly meetings and assigning discussion and grading.

COMPSCI 501 – Formal Language Theory Amherst, MA

Undergraduate Course Assistant, University of Massachusetts Amherst February 2026 - May 2026

- Made and graded homework questions on formal language theory, recursion theory, and complexity theory.
- Helped answer student questions and guiding them during weekly discussions and office hours.

Academic Leadership and Service

Theory@UMass Amherst, MA

Co-President May 2026 – Present

Officer September 2025 – May 2026

- Creating and releasing weekly problem sets in complexity and computability theory and discussing them with members in weekly meetings.
- Arranging talks by faculty and researchers, including Andrew McGregor, David A. Mix Barrington and Hung Le.