

XUANCHUN LU

(+44) 01223 764260 \diamond xl585@cam.ac.uk

EDUCATION

University of Cambridge

PhD in Pure Mathematics and Mathematical Statistics

Supervisor: Prof. Mark Gross

Oct 2023 — Ongoing

University of Warwick

MMath with First Class Honours

Relevant modules and marks:

- MA4A5 Algebraic Geometry (100%)
- MA4M6 Category Theory (100%)
- MA3G6 Commutative Algebra (100%)
- MA4J8 Commutative Algebra II (97%)
- MA4L7 Algebraic Curves (96%)

Sept 2019 — July 2023

AWARDS AND PRIZES

Department Prize

University of Warwick

2020/21, 2021/22, 2022/23

- I was awarded the Department Prize during the final three years of my undergraduate programme. The prize is awarded for academic excellence by the Warwick Mathematics Institute to normally the top three students from each year.

PROJECTS

Double ramification cycles in the punctured setting

Ongoing

- In the first part of the project, I showed that the punctured Gromov–Witten theory of a logarithmic point is fully described by higher-rank double ramification cycles. This should be seen as a first step in the ongoing work of comparing punctured Gromov–Witten theory and the theory of relative stable maps to rubber targets, which will form the second part of the project.

MMath Thesis: Birational Geometry of Wonderful Compactifications

Oct 2022 — June 2023

- I studied birational geometry of wonderful compactifications of hyperplane arrangement complements, in particular their Mori cones. I showed that the previous bounds on Mori cones obtained by Gibney–Maclagan are not tight even in the case of line arrangements, and that these bounds can be refined assuming that there is a general description of tropicalisations of projective duals. I then computed tropical projective duals for generic cubic curves and some other mildly degenerate cubic curves in \mathbb{P}^3 .
- Supervisor: Professor Diane Maclagan

Third Year Essay Project: Mirror Symmetry for dP_5

Research Module at University of Warwick

Oct 2021 — June 2022

- I produced an exposition on the mirror construction of Gross–Hacking–Keel for log Calabi–Yau surfaces, and described the procedure explicitly for the del Pezzo surface of degree 5.
- Module marks: 96% (essay), 99% (oral presentation)
- Supervisor: Professor Miles Reid

URSS Project: Lines on Quintic Threefolds

July 2021 — Sept 2021

Undergraduate Research at University of Warwick

- I undertook a summer reading project concerning intersection theory on Grassmannians, culminating in the enumeration of lines on general quintic threefolds. A bursary of £850 was awarded by the *Undergraduate Research Support Scheme* to carry out this 8-week long project.
- Supervisor: Dr. Chunyi Li

READING GROUPS AND SEMINARS

Reading Groups

- Categorical enumerative invariants (Michaelmas 2024/25, ongoing)
 - Talks given:
 - An introduction to A_∞ -algebras and their Hochschild/periodic cyclic homology
 - Partition function of a general topological field theory
 - Comparison with the Fock space formalism of Coates–Givental
- Gopakumar–Vafa invariants (Lent (Term 2), 2023/24)
- Virtual fundamental classes (Michaelmas (Term 1), 2023/24)
 - Talks given:
 - Motivation of the construction
 - Introduction to cone stacks
 - Perfect obstruction theory for spaces of stable/logarithmic/punctured maps
- Stacks and descent (Autumn term, 2022/23)
- Toric varieties (based on *Toric Varieties* by Cox, Little, Schenck) (Spring term, 2021/22)
- Scheme theory (Autumn term, 2021/22)

Seminar Talks

- Junior Algebraic Geometry Seminar, Warwick (5 Dec 2024, Upcoming)
 - Title: Double ramification cycles in the punctured setting
- Junior Geometry Seminar, Cambridge (25 Oct 2024)
 - Title: Double ramification cycles in the punctured setting
- Graduate Seminar on Algebraic Surfaces, Warwick (14 Oct 2021)
 - Title: Lines and other combinatorial structures on dP_5 .

TEACHING EXPERIENCES

Supervisor

Jan 2024 — Present

University of Cambridge

- Conducted 2-to-1 teaching sessions for undergraduate students and graded their assignments.
- Courses taught: Part II Algebraic Geometry (5 Students, Lent 2023/24); Part IA Revision (6 Students, Easter 2023/24)

Teaching Assistant

Oct 2022 — June 2023

University of Warwick

- Responsible for conducting weekly 1-hour small group sessions for three groups of five first year undergraduate students, and the grading of their coursework assignments.