

Louis Esser

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EMPLOYMENT

Princeton University
Instructor in Mathematics

Princeton, New Jersey
Sept. 2023-present

EDUCATION

University of California, Los Angeles
Ph.D., Mathematics
Advisor: Burt Totaro

Los Angeles, California
Sept. 2018-June 2023

University of Pennsylvania
B.A., Mathematics, Physics (Astrophysics Concentration)
Honors: *summa cum laude*

Philadelphia, Pennsylvania
Aug. 2014-May 2018

RESEARCH INTERESTS

Algebraic geometry, especially equivariant birational geometry and rationality problems.

PUBLICATIONS

1. L. Esser. Rational weighted projective hypersurfaces. *Int. Math. Res. Not. IMRN* **2025** (2025), no. 1, 21-30.
2. L. Esser, J. Liu, C. Wang. Exceptional Fano varieties with small minimal log discrepancy. *Math. Res. Lett.*, to appear.
3. L. Esser, J. Li. Hypersurfaces with large automorphism groups. *Trans. Amer. Math. Soc.* **378** (2025), no. 5, 3667-3698.
4. L. Esser. The dual complex of a G -variety. *Math. Z.* **308**, 51 (2024).
5. L. Esser, L. Ji, J. Moraga. Symmetries of Fano varieties. *J. Reine Angew. Math.* **819** (2025), 89-133.
6. L. Esser, B. Totaro. Log canonical pairs with conjecturally minimal volume. *Manuscripta Math.* **175** (2024), 865-895.
7. L. Esser. Minimal log discrepancies and mirror symmetry. *Forum Math. Sigma* **12** (2024), e23.
8. L. Esser. Automorphisms of weighted projective hypersurfaces. *J. Pure Appl. Algebra* **228** (2024), no. 6, 107628.
9. L. Esser, B. Totaro, C. Wang. Calabi-Yau varieties of large index. *Algebr. Geom.*, to appear.
10. L. Esser, F. Scavia. Quotient singularities in the Grothendieck ring of varieties. *J. Algebraic Geom.* **34** (2025), 183-204.
11. M. Chen, L. Esser, C. Wang. On explicit birational geometry for minimal n -folds of canonical dimension $n - 1$. *Bull. Lond. Math. Soc.* **56** (2024), no. 1, 319-337.
12. L. Esser, B. Totaro, C. Wang. Varieties of general type with doubly exponential asymptotics. *Trans. Amer. Math. Soc. Ser. B* **10** (2023), 288-309.
13. L. Esser, T. Tao, B. Totaro, C. Wang. Optimal sine and sawtooth inequalities. *J. Fourier Anal. Appl.* **28** (2022) no. 2, Paper No. 14, 21 pp.
14. L. Esser. Non-torsion Brauer groups in positive characteristic. *Proc. Amer. Math. Soc.* **151** (2023), no. 2, 527-531.

PREPRINTS

1. L. Esser, J. Li. Weighted surfaces with maximal Picard number. E-print: [arXiv:2506.14037](https://arxiv.org/abs/2506.14037)
2. N. Chen, L. Esser. Group actions and irrationality in surface families. *Submitted*. E-print: [arXiv:2410.18427](https://arxiv.org/abs/2410.18427)

FELLOWSHIPS & AWARDS

- McGraw Center Inclusive Pedagogy Grant 2025
- Pacific Journal of Mathematics Dissertation Prize 2023
- UCLA Dissertation Year Fellowship 2022-2023
- Barrett O'Neill Memorial Award (UCLA) 2022
- Liggett Fellow Award for Excellence in Teaching (UCLA) 2022
- Horn-Moez Prize for Excellence in First-Year Graduate Studies (UCLA) 2019
- University of Pennsylvania Undergraduate Mathematics Research Award 2018
- University of Pennsylvania Mathematics Good Teaching Award 2017
- Benjamin Franklin Scholar 2014-2018

INVITED CONFERENCE & SEMINAR TALKS

- University of Hannover Algebraic Geometry Research Seminar, online May 2025
- University of Illinois Urbana-Champaign Algebraic Geometry Seminar Apr. 2025
- Michigan State Algebra Seminar Apr. 2025
- Tsinghua University Algebraic Geometry Seminar, online Nov. 2024
- University of Utah Algebraic Geometry Seminar Oct. 2024
- NYU Courant Algebraic Geometry Seminar Sept. 2024
- UC Davis Algebra & Discrete Mathematics Seminar May 2024
- UCLA Algebra Seminar May 2024
- Harvard-MIT Algebraic Geometry Seminar Apr. 2024
- Northwestern Algebraic Geometry Seminar Feb. 2024
- Southern California Algebraic Geometry Seminar (SoCalAGS), UC San Diego May 2023
- Stanford Algebraic Geometry Seminar Oct. 2023
- Columbia Algebraic Geometry Seminar Oct. 2023
- Johns Hopkins Algebraic Geometry Seminar Sept. 2023
- Seminar on Geometry and Arithmetic, UC Santa Barbara Apr. 2023
- UC Riverside Algebraic Geometry Seminar, online Apr. 2023
- Nottingham University Algebraic Geometry Seminar, online Apr. 2023
- Birational Complexity of Algebraic Varieties Workshop, Simons Center Dec. 2022
- UC Davis Algebraic Geometry Seminar Nov. 2022
- University of Michigan Algebraic Geometry Seminar Nov. 2022
- University of Washington Algebra and Algebraic Geometry Seminar, online Mar. 2022
- Valley Geometry Seminar at UMass Amherst Dec. 2021
- Stanford Algebraic Geometry Seminar, online Dec. 2021
- American Graduate Student Algebraic Geometry Seminar (AGSAGS), online Mar. 2021

TEACHING

Instructorships at Princeton University

- Abstract Algebra I Fall 2025
- Honors (proof-based) Linear Algebra Spring 2025
- Multivariable Calculus Fall 2024

- Linear Algebra with Applications *Fall 2023, Spring 2024*

Teaching Assistant Consultant (UCLA)

Aug. 2022-June 2023

- Designed curriculum for intensive TA training for the mathematics department
- Attended educational development academy for TAC's across UCLA
- Prepared and led weekly sections of Math 495: Teaching Undergraduate Mathematics

Other Teaching Assistantships at UCLA

- Precalculus *2021*
- Calculus Laboratory *2020*
- Proof-based Linear Algebra *2019-2021*
- Calculus for Life Sciences Parts I, II, III *2018-2022*

Teaching Assistantships and Tutoring at the University of Pennsylvania

- Linear Algebra and Differential Equations (TA) *2016*
- Introductory Calculus, Differential Equations, Linear Algebra (tutoring) *2015, 2016*

SERVICE & MENTORSHIP

Refereeing: *Journal of Algebraic Geometry; International Mathematics Research Notices; Mathematische Zeitschrift; Forum of Mathematics, Sigma; Journal of Algebra; Algebraic Geometry and Physics*

Reviews: Reviewer for Mathematical Reviews

Seminar Organizing:

- Princeton Algebraic Geometry Seminar *Fall 2023-present*
- Princeton Algebraic Geometry Preprint Seminar *Fall 2025-present*

Princeton Summer Internship Program

Los Angeles, California

Faculty mentor

Jun. 2024-Aug. 2024

- Conducted summer research project in toric geometry for undergraduate intern
- Facilitated student participation in Princeton's Summer Research Colloquium

UCLA Mathematics Directed Reading Program

Los Angeles, California

Board member, mentor

Jan. 2019-June 2023

- Organized the directed reading program (DRP), including the application, pairing process, and student colloquium
- Developed research projects for multiple students in algebraic geometry, category theory, and topology
- Coordinated the DRP with other mathematics organizations and boosted participation by under-represented groups in mathematics

Explore Your Universe UCLA

Los Angeles, California

Volunteer

Sept. 2018-June 2023

- Created hands-on mathematics activities geared towards kids of various age groups
- Worked with elementary, middle, and high school students to foster mathematics enthusiasm

University of Pennsylvania Abuse and Sexual Assault Prevention

Philadelphia, Pennsylvania

Education Chair

Aug. 2017-May 2018

- Planned and executed curricula for weekly meetings and events
- Organized collaborations with other campus student and advocacy groups
- Engaged in dialogue with university staff on issues of interpersonal violence

Junior Jump Start*College Coach***Philadelphia, Pennsylvania***Jan. 2016-May 2016*

- Prepared an 11th grade student for college applications in one-on-one sessions
- Collaborated on a project to improve the program

West Philadelphia Tutoring Project*Tutor***Philadelphia, Pennsylvania***Sept. 2014-May 2015*

- Instructed 5th grade students individually in mathematics and reading
- Developed lesson plans tailored to students' needs
- Assisted teachers in elementary school classrooms