

Louis Esser

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EMPLOYMENT

Princeton University
Instructor in Mathematics

Princeton, New Jersey
Sep. 2023-

EDUCATION

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

Los Angeles, California
Sep. 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 AND PREPRINTS

11. L. Esser. The dual complex of a G -variety. *Submitted*. E-print: [arXiv:2312.04499](https://arxiv.org/abs/2312.04499)
10. L. Esser, L. Ji, J. Moraga. Symmetries of Fano varieties. *Submitted*. E-print: [arXiv:2308.12958](https://arxiv.org/abs/2308.12958)
9. L. Esser, B. Totaro. Log canonical pairs with conjecturally minimal volume. *Submitted*. E-print: [arXiv:2308.08034](https://arxiv.org/abs/2308.08034)
8. L. Esser. Minimal log discrepancies and mirror symmetry. *Forum Math. Sigma* **12** (2024), e23. E-print: [arXiv:2304.13823](https://arxiv.org/abs/2304.13823)
7. L. Esser. Automorphisms of weighted projective hypersurfaces. *J. Pure Appl. Algebra* **228** (2024), no. 6, 107628. E-print: [arXiv:2301.07872](https://arxiv.org/abs/2301.07872)
6. L. Esser, B. Totaro, C. Wang. Calabi-Yau varieties of large index. *Submitted*. E-print: [arXiv:2209.04597](https://arxiv.org/abs/2209.04597)
5. L. Esser, F. Scavia. Quotient singularities in the Grothendieck ring of varieties. *J. Algebraic Geom.*, to appear. E-print: [arXiv:2208.14313](https://arxiv.org/abs/2208.14313)
4. 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. E-print: [arXiv:2201.08966](https://arxiv.org/abs/2201.08966)
3. L. Esser, B. Totaro, C. Wang. Varieties of general type with doubly exponential asymptotics. *Trans. Amer. Math. Soc. Ser. B* **10** (2023), 288-309. E-print: [arXiv:2109.13383](https://arxiv.org/abs/2109.13383)
2. 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. E-print: [arXiv:2107.11058](https://arxiv.org/abs/2107.11058)
1. L. Esser. Non-torsion Brauer groups in positive characteristic. *Proc. Amer. Math. Soc.* **151** (2023), no. 2, 527-531. E-print: [arXiv:2102.01799](https://arxiv.org/abs/2102.01799)

FELLOWSHIPS & AWARDS

- 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

TALKS

Conference Talks

- "The dual complex of a G -variety," (poster) Jan 2024
Higher Dimensional Algebraic Geometry, Celebrating James' 60th, UC San Diego
- "Minimal log discrepancies and mirror symmetry," May 2023
Southern California Algebraic Geometry Seminar (SoCalAGS), UC San Diego
- "Automorphisms of weighted projective hypersurfaces," (poster) Apr. 2023
Western Algebraic Geometry Symposium (WAGS), University of Washington
- "Calabi-Yau varieties with extreme invariants," (speed talk) Dec. 2022
Birational Complexity of Algebraic Varieties Workshop, Simons Center
- "Quotient singularities in the Grothendieck ring of varieties," (poster) Nov. 2022
Western Algebraic Geometry Symposium (WAGS), UC Riverside
- "Calabi-Yau pairs of large index," (speed talk) June 2022
Algebraic Geometry and Singularities Conference, University of Washington
- "Varieties with small volume," (poster) Oct. 2021
Algebraic Geometry Northeastern Series Showcase (AGNES), online

Visiting Seminar Talks

- "The dual complex of a G -variety," Apr. 2024
Harvard-MIT Algebraic Geometry Seminar
- "The dual complex of a G -variety," Feb. 2024
Northwestern Algebraic Geometry Seminar
- "Symmetries of Fano varieties," Oct. 2023
Stanford Algebraic Geometry Seminar
- "Symmetries of Fano varieties," Oct. 2023
Columbia Algebraic Geometry Seminar
- "Symmetries of Fano varieties," Sep. 2023
Johns Hopkins Algebraic Geometry Seminar
- "Automorphisms of weighted projective hypersurfaces," Apr. 2023
Seminar on Geometry and Arithmetic, UC Santa Barbara
- "Automorphisms of weighted projective hypersurfaces," Apr. 2023
UC Riverside Algebraic Geometry Seminar, online
- "Automorphisms of weighted projective hypersurfaces," Apr. 2023
Nottingham University Online Algebraic Geometry Seminar
- "Quotient singularities in the Grothendieck ring of varieties," Nov. 2022
UC Davis Algebraic Geometry Seminar
- "Quotient singularities in the Grothendieck ring of varieties," Nov. 2022
University of Michigan Algebraic Geometry Seminar

- "Varieties of general type with large canonical dimension," Mar. 2022
University of Washington Algebra and Algebraic Geometry Seminar, online
- "Varieties of general type with doubly exponential asymptotics," Dec. 2021
Valley Geometry Seminar at UMass Amherst
- "Varieties of general type with doubly exponential asymptotics," Dec. 2021
Stanford Algebraic Geometry Seminar, online
- "Non-torsion Brauer groups," Mar. 2021
American Graduate Student Algebraic Geometry Seminar (AGSAGS), online

TEACHING

Instructorships at Princeton University

- Linear Algebra with Applications Fall 2023, Spring 2024

Teaching Assistant Consultant

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 the University of California, Los Angeles

- Precalculus 2021
- Calculus Laboratory 2020
- Upper Division 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

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

Sep. 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***Sep. 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