

CONTACT INFORMATION	Simons Center for Geometry and Physics State University of New York Stony Brook, NY 11794-3636 +1-631-632-2825 joseph.helfer@stonybrook.edu https://www.jojhelfer.com/
CITIZENSHIP	Canadian, Swedish
RESEARCH INTERESTS	Higher structures, categorical logic, algebraic geometry, symplectic geometry
EMPLOYMENT	Simons Center for Geometry and Physics Research Assistant Professor, 2024–present University of Southern California Assistant Professor in Mathematics, 2021–2024
EDUCATION	Stanford University Ph.D. in Mathematics, August 2021 • Thesis: Holomorphic curve invariants of open contact manifolds • Advisor: Yakov Eliashberg McGill University M.Sc. in Mathematics, May 2015 • Thesis: Counting Cycles in Labeled Graphs • Advisor: Daniel Wise Technische Universität Berlin B.Sc. in Mathematics, October 2013 • Thesis: The secondary fan of a punctured Riemann surface • Minor in physics
PUBLICATIONS	The Borel topos (with Patrick Lutz and Forte Shinko). 2026. Set-theoretic universes and paradoxes in 2-topoi. 2026. Submitted. Preprint available at arXiv:2607.28584 Y is a least fixed point combinator. 2025. Submitted. Preprint available at arXiv:2504.19379 The Integral Chow ring of $\mathcal{M}_2^{\text{ct}}$ (with Eric Jovinelly, Eric Larson, Anda Tenie, and Chengxi Wang). 2025. Submitted. Preprint available at arXiv:2503.04912 Internal 1-topoi in 2-topoi. <i>Theory Appl. Categ.</i> 45 (2026), no. 21, 779–862. Severi curves of rational elliptic surfaces (with François Greer and John Sheridan). <i>Int. Math. Res. Not.</i> 2025, no. 20, 1–33. Exotic contact structures on $\mathbb{R}^n$ (with François-Simon Fauteux-Chapleau). <i>J. Symplectic Geom.</i> 23 (2025), no. 1, 227–283 First-Order Homotopical Logic. <i>J. Symb. Log.</i> 90 (2025), no. 2, 564–626. Homotopies in Grothendieck fibrations. <i>Theory Appl. Categ.</i> 35 (2020), no. 35, 1312–1378. A note on maxima in random walks (with Daniel T. Wise). <i>Electron. J. Combin.</i> 23 (2016), no. 1, Paper 1.17, 10 pp. Counting Cycles in Labeled Graphs: The Nonpositive Immersion Property for One-Relator Groups (Daniel T. Wise). 2015. <i>Int. Math. Res. Not.</i> 2016, no. 9, 2813–2827.

HONORS AND AWARDS	2022	University of Southern California Zumberge Individual Research award	
	2014	National Science and Engineering Research Council of Canada Master’s Award	
ORGANIZATIONAL ACTIVITIES	<i>Stony Brook ∞-category seminar</i> Organizer, Spring 2025-present		
	<i>USC geometry and topology qualifying exam</i> Chair, Fall 2023. Committee member, Fall 2022 and Spring 2023		
	<i>USC topology seminar</i> Co-organizer, Fall 2021-Spring 2024		
	<i>Los Angeles joint topology seminar</i> Organizer, Spring 2023		
	<i>Southern California Symplectic Geometry Workshop</i> Co-organizer, Fall 2022		
COURSES TAUGHT	<i>Linear algebra II</i> Stony Brook University, Fall 2025 and Fall 2026, and USC, Spring 2022		
	<i>Ordinary Differential Equations</i> Stony Brook University, Spring 2025	<i>Logic, Language, and Proof</i> Stony Brook University, Fall 2024	
	<i>Complex algebraic geometry</i> USC, Fall 2024	<i>Differential geometry of curves and surfaces</i> USC, Spring 2023 and Spring 2024	
	<i>Algebraic topology</i> USC, Fall 2021 and Fall 202	<i>Point-set topology</i> USC, Fall 2022	
	<i>Calculus III</i> Stanford, Summer 2020		
OTHER TEACHING ACTIVITIES	<i>Supervisor for Stony Brook URECA Explorations in STEM summer research program</i> Summer 2025 and 2026		
	<i>Supervisor for undergraduate Directed Research course (“MATH 490”/“MAT 487”)</i> USC, Spring 2022 and Spring 2024, and Stony Brook University, Fall 2025 and Spring 2026		
	<i>Mentor for undergraduate Directed Reading Program</i> Stanford, 9 times, Winter 2017-Spring 2021		
	<i>Teacher at Summer School on Univalent Mathematics</i> University of Birmingham, Summer 2017 and 2019		
	<i>Teaching Assistant</i> Technical University of Berlin, McGill University, and Stanford, 21 times		
REVIEWING ACTIVITIES	<i>Henry, Simon et al., On the homotopy hypothesis for 3-groupoids.</i> Mathscinet reviewer		
	<i>Ara, Dimitri et al., A categorical characterization of strong Steiner ω-categories.</i> Mathscinet reviewer		
	<i>Gagna, Andrea et al., Bilimits are bifinal objects</i> Mathscinet reviewer		
	<i>Journal of Symbolic Logic</i> Anonymous referee		
	<i>Theory and Application of Categories</i> Anonymous referee		