Maru Sarazola
Curriculum vitae

Contact Information

School of Mathematics
University of Minnesota
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Fields of Interest

Homotopy theory, category theory, algebraic K-theory, algebraic topology, applied category theory

Employment

2023-present	Assistant Professor, School of Mathematics, University of Minnesota, Minneapolis, MN
2021-2023	J.J. Sylvester Assistant Professor, Department of Mathematics, Johns Hopkins University, Baltimore, MD

Education

2015-2021	**Cornell University** Ithaca, NY, USA M.S. in Mathematics (2017) Ph.D. in Mathematics (2021) Dissertation: "Constructing K-theory spectra from algebraic structures with a class of acyclic objects" Advisor: Inna Zakharevich
2010-2015	**Universidad de la República** Montevideo, Uruguay Bachelor in Mathematics, Monograph: "Symmetries in three homological dimensions" Advisor: Marcelo Lanzilotta

Publications and preprints

(1) **A comparison of definitions of equivariant trees**;
Julie Bergner, Maxine Calle, David Chan, Angélica Osorno and Maru Sarazola.
submitted `https://arxiv.org/abs/2512.14956`
(2) **Double categorical equivalences**;
Lyne Moser, Maru Sarazola and Paula Verdugo.
submitted `https://arxiv.org/pdf/2509.23181`
(3) **Thomason's colimit theorem for the double category of elements**;
Andrew Gill and Maru Sarazola.
submitted `https://arxiv.org/abs/2506.08246`

(4) **Squares K-theory and 2-Segal spaces**;
Maxine E. Calle and Maru Sarazola.
submitted `https://arxiv.org/abs/2409.16428`

(5) **A concise proof of the stable model structure on symmetric spectra**;
Cary Malkiewich and Maru Sarazola.
`https://arxiv.org/abs/2402.04220`

(6) **Internal Grothendieck construction for enriched categories**;
Lyne Moser, Maru Sarazola and Paula Verdugo.
submitted `https://arxiv.org/abs/2308.14455`

(7) **Additivity and fiber sequences for combinatorial K-theory**;
Maru Sarazola and Brandon Shapiro.
submitted `https://arxiv.org/abs/2107.07701`

(8) **Equivariant trees and partition complexes**;
Julie Bergner, Peter Bonventre, Maxine Calle, David Chan and Maru Sarazola.
to appear in Theory and Applications of Categories `https://arxiv.org/abs/2302.08949`

(9) **Fibrantly-transferred model structures**;
Léonard Guetta, Lyne Moser, Maru Sarazola and Paula Verdugo.
to appear in Transactions of the AMS `https://arxiv.org/abs/2301.07801`

(10) **A combinatorial construction of homology via ACGW categories**;
Maru Sarazola, Brandon Shapiro and Inna Zakharevich.
to appear in Contemporary Mathematics `https://arxiv.org/abs/2410.00276`

(11) **A model structure for Grothendieck fibrations**;
Lyne Moser and Maru Sarazola.
Journal of Pure and Applied Algebra, vol. 228 (2024), no. 10

(12) **Cofibration category of digraphs for path homology**;
Daniel Carranza, Brandon Doherty, Chris Kapulkin, Morgan Opie, Maru Sarazola and Liang Ze Wong.
Algebraic Combinatorics, vol. 7 (2024) no. 2, pp. 475-514.

(13) **A model structure for weakly horizontally invariant double categories**;
Lyne Moser, Maru Sarazola and Paula Verdugo.
Algebraic and Geometric Topology, vol. 23 (2023) pp. 1725–1786

(14) **A** 2Cat**-inspired model structure for double categories**;
Lyne Moser, Maru Sarazola and Paula Verdugo.
Cahiers de Topologie et Géométrie Différentielle Catégoriques vol. LXIII-2 (2022) pp. 184-236.

(15) **Stable homotopy hypothesis in the Tamsamani model**;
Lyne Moser, Viktoriya Ozornova, Simona Paoli, Maru Sarazola and Paula Verdugo.
Topology and its Applications, vol. 316 (2022)

(16) **Cotorsion pairs and a K-theory localization theorem**;
Maru Sarazola.
Journal of Pure and Applied Algebra vol. 224 (2020), no. 11.

(17) **A recipe for black box functors**;
Brendan Fong and Maru Sarazola.
Theory and Applications of Categories vol. 35 (2020) pp. 979-1011.

(18) **Biochemical coupling through emergent conservation laws**;
John C. Baez, Jonathan Lorand, Blake Pollard and Maru Sarazola.
`https://arxiv.org/abs/1806.10764`

Awards and recognitions

2018 and 2020 — **Olivetti Egg Award**
Awarded each semester to the best speaker in Cornell's Math graduate student seminar "Olivetti Club".

2020	**Hutchinson Fellowship** Cornell Mathematics Department award for excellence in teaching and research, provides one semester of funding.
2019	**Deanne Gebell Gitner '66 and Family Annual Prize for Teaching Assistants** Awarded by Cornell's College of Arts and Sciences.
2018	**ACT 2018 Best Paper Prize** (shared jointly with one other paper) Awarded by the Applied Category Theory Research Week for the paper "Biochemical Coupling Through Emergent Conservation Laws".
2017	**Torng Prize** Cornell Mathematics Department award for outstanding teaching, provides one Summer of funding.

Grants and research funding

2025-2026	**PI, NSF Standard Grant DMS-2506116** "Combinatorial K-theory: A Kaleidoscope of Applications".
2025-2026	**co-PI, NSF Conference Grant DMS-2533398** "Equivariant, Motivic, and Physical Topology in the Midwest", University of Minnesota (with PI Westerland and co-PI Voronov).
2025-2028	**AIM's SQuaRE program (Structured Quartet Research Ensemble)** American Institute of Mathematics, Pasadena, California, "Algebras over genuine equivariant operads".
2024	**Research in Teams Grant** Banff International Research Station, "Algebraic K-theory of Lawvere theories".

Service and outreach

Event organization

2026	Co-organizer of the "International Category Theory Conference", Johns Hopkins University
2025	Co-organizer of the conference "Equivariant, Motivic, and Physical Topology in the Midwest", University of Minnesota
2024	Co-organizer of the workshop "Higher Segal Spaces and their Applications to Algebraic K-Theory, Hall Algebras, and Combinatorics", Banff, Canada
2023-2024, F2025	Co-organizer of the Topology Seminar, University of Minnesota
2021 - 2023	Co-organizer of the Topology Seminar, Johns Hopkins University
2022 - 2023	Started and organized the Topology Student Reading group, Johns Hopkins University Topics: Goodwillie calculus (Fall 2022), TQFTs (Spring 2023)
2018 - 2020	Started and organized the Homotopy Theory Student Seminar, Cornell University

Student supervision

PhD	Melissa Wei (2024–present, co-advised by Mike Hill)
Master's	Jacob Hinds (2024–2025)
Undergraduate Honors thesis	Andrew Gill (2025)

Undergraduate Capstone projects	Jack Spading (Spring 2026)
Graduate reading courses	Shuhang Xu (2023–2024) Emma Illig (Spring 2025) Luna Medlock (Fall 2025)

Other mentorship and thesis committees

PhD thesis committee	Liam Keenan, UMN (2024) Anh Hoang Tram Nam, UMN (2024)
PhD Oral exam committee	Connor Bass, UMN (2025) Spencer Martin, UMN (2025) Melissa Wei, UMN (2025) Mehmet Batu Bayindirli, UMN (2025) Shrivathsa Pandelu, UMN (2025)
Master's thesis committee	Ryan Tucker, UMN (2025) Daniel Teixeira, Universidade Federal de Minas Gerais, Brazil (2022)
Undergraduate honors thesis committee	Andrew Gill, UMN (2025) Cyrus Bjurlin, UMN (2024)
2023-2024	Research group leader for the workshop "Matemáticas en el Cono Sur", Montevideo, Uruguay
Fall 2023	Mentor for the online workshop "Workshop on $(\infty, 2)$-categories"
Spring 2023	Mentor for an undergraduate Independent Study at Johns Hopkins University *Topic: Category theory*
Spring 2020	Mentor in the Directed Reading Program at Cornell University. *Topic: Higher algebraic K-theory.*

Editorial work

2024-2025	Co-editor of a Proceedings volume of the workshop "Higher Segal Spaces and their Applications to Algebraic K-Theory, Hall Algebras, and Combinatorics", to be published in Contemporary Mathematics (AMS)

Refereeing

Program Committee member	Applied Category Theory Conference (2023, 2024) SYCO: Symposium on Compositional Structures (2021, 2023)
Reviewer	Journal of the Institute of Mathematics of Jussieu Proceedings of the AMS Homology, Homotopy and Applications Theory and Applications of Categories Communications in Algebra
	Review panel member for NSF DMS Topology grant

Other

2025	Led a mini-workshop for the Mathematics Project at Minnesota (MPM), University of Minnesota
2021	TA for the Applied Category Theory Adjoint School *Mentor: Prof. Simona Paoli. Project: Double categories in applied category theory*

2020	TA trainer, Cornell University.
Spring 2017	Planned and led a session of the Math Explorer's Club; an extracurricular program that introduces new mathematical concepts to grades 8-12 students, Cornell University
2016 - 2021	Class representative, Cornell University
2012 - 2013	Student representative for the Directive Committee of the Mathematics Department, School of Sciences, Universidad de la República

Department faculty committees

2025-2026 academic year	Graduate awards committee, UMN Equity and inclusion committee, UMN
2024-2025 academic year	Dunham Jackson postdoc search committee, UMN Term faculty search committee, UMN
2023-2024 academic year	Graduate admissions committee, UMN Social committee, UMN

Conference talks

2025	"Double categorical equivalences", AMS Sectional Meeting, Special Session on Homotopy Theory, St. Louis, MO, USA
2025	"Double categorical equivalences", International Category Theory Conference, Brno, Czech Republic
2025	"K-theory of manifolds up to cut-and-paste", AMS Sectional Meeting, Special Session on Homotopy Theory and Algebraic K-theory, Lawrence, KA, USA
2025	"K-theory of manifolds up to cut-and-paste", StolzFest: A Midwest Topology Meeting, University of Notre Dame, IN, USA
2024	"Double-categorical frameworks for algebraic K-theory", Second Virtual Workshop on Double Categories
2024	"Fibrant transfer for model structures", Algebraic structures in topology, San Juan, Puerto Rico
2024	"A model structure for Grothendieck fibrations", Mid-Atlantic Topology Conference, Northeastern University, Boston, MA, USA
2024	"A model structure for Grothendieck 2-fibrations", Workshop: Matemáticas en el Cono Sur, Montevideo, Uruguay
2023	"A homotopical framework for path homology of directed graphs", Collaborative team conference, University of Virginia, Charlottesville, VA, USA
2023	"A homotopical framework for path homology of directed graphs", 9th Mexican Workshop on Applied Geometry and Topology, CIMAT (online), Mexico
2023	"A category of elements for enriched functors", International Category Theory Conference, Louvain-la-Neuve, Belgium
2023	"Algebraic K-theory via double categories", Beyond finite sets – homotopy theory and combinatorics, Copenhagen, Denmark
2023	"Fibrantly-induced model structures", South Central Topology Conference, Texas State University, San Marcos, TX, USA

2022	"Semi-right induced model structures on internal categories", AMS Sectional Meeting, Special Session on Higher Structures and Homotopical Algebra, Amherst, MA, USA
2022	"The stable homotopy hypothesis", Women in Topology Special Session, Joint Math Meetings, Seattle, WA, USA (moved online)
2021	"A Gillet–Waldhausen Theorem for chain complexes of sets", VI Congreso Latinoamericano de Matemáticos, Montevideo, Uruguay
2019	"Cotorsion pairs and a K-theory localization theorem", VII Coloquio Uruguayo de Matemática, Montevideo, Uruguay
2019	"Constructing Waldhausen categories from cotorsion pairs", AMS Sectional Meeting, Special Session on Homotopy Theory and Algebraic K-theory, Binghamton, NY, USA
2019	"Constructing model and Waldhausen category structures via cotorsion pairs", Young Topologists Meeting, EPFL, Lausanne, Switzerland
2019	"A recipe for black box functors", International Category Theory Conference, Edinburgh, Scotland
2019	"A recipe for black box functors", Applied Category Theory Conference, Oxford, United Kingdom
2019	"An introduction to algebraic K-theory", 55th Topology Festival, Cornell University, Ithaca, NY, USA
2018	"Category theory in action", 43rd Annual New York Regional Graduate Mathematics Conference, Syracuse, New York, USA
2017	"Detecting algebraic categories with an internal Hom", International Category Theory Conference, Vancouver, Canada.

Seminar/colloquium talks

2026 upcoming	TBD, AMTRaK Seminar, University of Pennsylvania, Philadelphia, PA, USA
2026 upcoming	TBD, Geometry-Topology Seminar, University of Pennsylvania, Philadelphia, PA, USA
2026 upcoming	TBD, Math & Statistics Colloquium, Reed University, Portland, OR, USA
2026 upcoming	TBD, Topology and Geometry Seminar, University of Haifa, Haifa, Israel
2026	"Double categorical equivalences", Topology Seminar, University of Virginia, Charlottesville, VA, USA
2025	"Snapshots of a double-categorical world", AMS Intro to Research Seminar, University of Minnesota, Minneapolis, MN, USA
2025	"Double categorical equivalences", Topology seminar, University of Minnesota, Minneapolis, MN, USA
2025	"Double categorical equivalences", Topos Institute, Berkeley, CA, USA
2025	"Double categorical equivalences", Topology Seminar, University of Illinois Urbana-Champaign, Champaign, IL, USA
2025	"Squares K-theory and 2-Segal spaces", Topology Seminar, University of Indiana Bloomington, Bloomington, IN, USA
2025	"A category of elements for enriched functors", Topology Seminar, Northwestern University, Evanston, IL, USA

2025	"A category of elements for enriched functors", Topology Seminar, University of Chicago, Chicago, IL, USA
2024	"Squares K-theory and 2-Segal spaces", Topology Seminar, Michigan State University, East Lansing, MI, USA
2024	"Squares K-theory and 2-Segal spaces", Atlantic Category Theory Seminar, Dalhousie University, Halifax, Canada
2024	"A category of elements for enriched functors", Algebra Seminar, Universidad de la República, Montevideo, Uruguay
2024	"Exploring notions of "sameness"", Undergraduate Colloquium, Northwestern University, Evanston, IL, USA
2023	"What does research in category theory look like?", AMS Intro to Research Seminar, University of Minnesota, Minneapolis, MN, USA
2023	"Algebraic K-theory via double categories", Seminar: Topics in $(\infty, 2)$-categories, Universitat Regensburg, Regensburg, Germany
2023	"A homotopical framework for path homology of graphs", Mathematics colloquium, University of Minnesota, Minneapolis, MN, USA
2023	"Fibrant transfer for model structures", Geometry and Topology Seminar, Binghamton University, Binghamton, NY, USA
2023	"Fibrant transfer for model structures", Topology Seminar, University of Minnesota, Minneapolis, MN, USA
2023	"Fibrantly-induced model structures", Algebraic Topology Seminar, Columbia University, New York City, NY, USA
2022	"Semi-right induced model structures on internal categories", Homotopy theory seminar, University of Pennsylvania, Philadelphia, PA, USA
2022	"A category theorist's overview of algebraic K-theory", Homotopy type theory seminar, Carnegie Mellon University, Pittsburgh, USA
2021	"Double categories and K-theory", Category theory seminar, Johns Hopkins University, Baltimore, USA
2021	"A Gillet–Waldhausen Theorem for chain complexes of sets", UNR Algebraic and Geometric Topology Seminar, University of Nevada, Reno, USA
2021	"A Gillet–Waldhausen Theorem for chain complexes of sets", Topology seminar, University of Louisiana at Lafayette, USA
2021	"Cotorsion pairs and a K-theory localization theorem", Homological Algebra Seminar, Universidad de Buenos Aires, Argentina
2021	"The stable homotopy hypothesis", Category Theory Seminar, Universidad Nacional Autónoma de México, Mexico
2021	"Cotorsion pairs and a K-theory localization theorem", Algebra/Topology Seminar, University of Copenhagen, Denmark
2021	"Cotorsion pairs and a K-theory localization theorem", Topology Seminar, University of Chicago–Northwestern University, USA
2021	"Cotorsion pairs and a K-theory localization theorem", Topology Seminar, Purdue University, USA
2020	"The stable homotopy hypothesis", Algebra Seminar, Masaryk University, Brno, Czech Republic

2020	"The stable homotopy hypothesis", Topology Seminar, University of Virginia, Charlottesville, VA, USA
2020	"Homology for sets", Olivetti Club, Cornell University, Ithaca, NY, USA
2020	"Two model structures for double categories", MIT Categories Seminar, MIT, Cambridge, MA, USA
2020	"Two model structures for double categories", Topology Seminar, EPFL, Lausanne, Switzerland
2020	"A model structure for double categories", Category Theory Seminar, Universidad de la República, Uruguay
2020	"An introduction to model categories", Category Theory Seminar, Universidad de la República, Uruguay
2019	"Additivity in K-theory", Berstein Seminar in Topology, Cornell University, Ithaca, NY, USA
2019	"Cotorsion pairs and a K-theory localization theorem", Hopkins Topology Seminar, Johns Hopkins University, Baltimore, MD, USA
2019	"Constructing Waldhausen structures on exact categories via cotorsion pairs", a series of two talks for the Homotopy Theory Student Seminar, Cornell University, Ithaca, NY, USA
2018	"Applying category theory to real life (for real)", Olivetti Club, Cornell University, Ithaca, NY, USA
2018	"A compositional framework for reaction networks" –together with Sasha Targ, Applied Category Theory Seminar (Online seminar)
2018	"∞-categories and why we should care about them", a series of three talks for the Homotopy Theory Student Seminar, Cornell University, Ithaca, NY, USA
2018	"Category theory in action", Olivetti Club, Cornell University, Ithaca, NY, USA
2017	"Algebra valued functors in general and tensor products in particular", Kan Extension Seminar II (Online seminar)
2014	"A theorem of Kaplansky", Algebra Seminar, Universidad de la República, Montevideo, Uruguay
2014	"The (semi)simple things", Student Seminar, Universidad de la República, Montevideo, Uruguay

Workshop and seminar participation

2024	Matematicas en el Cono Sur, Montevideo, Uruguay
2024	Higher Segal Spaces and their Applications to Algebraic K-Theory, Hall Algebras, and Combinatorics, Banff, Canada
2022	Collaborative Workshop in Homotopy Theory, Lexington, VA, USA
2022	Higher Categories and Categorification Part Two, Cuernavaca, Mexico
2020	(∞, n)-categories, factorization homology, and algebraic K-theory, MSRI, Berkeley, CA, USA
2020	Introductory Workshop: Higher Categories and Categorification, MSRI, Berkeley, CA, USA

2020	Connections for Women: Higher Categories and Categorification, MSRI, Berkeley, CA, USA
2019	Women in Topology III, Bonn, Germany
2018	The MIT Talbot Workshop: Model-independent theory of ∞-categories, Oregon, USA. Talk: "∞-cosmoi and their homotopy 2-categories"
2018	Applied Category Theory Research Week, Lorentz Center, Leiden, The Netherlands
Spring 2018	The Kan Extension Lab, a semester-long online seminar organized by Brendan Fong and Nina Otter
Spring 2017	The Kan Extension Seminar II, a semester-long online seminar organized by Emily Riehl, Alexander Campbell and Brendan Fong
2017	Instructional skills workshop (a 26-hour long workshop on tools for active learning), Cornell University, Ithaca, NY, USA

Teaching experience

2023-present **University of Minnesota**

Math 4281 (Fundamental Structures of Algebra)	Spring 2025
Math 8203 (Category Theory and Homological Algebra)	F2024, S2026
Math 5285H (Honors Algebra 1)	Fall 2023, 2025
Math 5286H (Honors Algebra 2)	Spring 2024

2021-2023 **Johns Hopkins University**
Instructor

Math 710 (What is... Seminar) *Graduate topics course: math communication*	Fall 2022
Math 411 (Honors algebra 1)	Fall 2022
Math 212 (Honors linear algebra)	F2021, S2022, S2023
Math 106 (Calc. 1 for bio)	Fall 2021

2015-2020 **Cornell University**

Instructor

Math 1120 (Calc. 2)	Fall 2020

Teaching Assistant

Math 1106 (Calc. for the life sciences)	Spring 2018
Math 1910 (Calc. for engineers)	Fall 2015, Fall 2017

Head Teaching Assistant

Math 1106 (Calc. for the life sciences)	Spring 2019
Math 1910 (Calc. for engineers)	Fall 2016
Math 1110 (Calc. 1)	Fall 2018, Fall 2019
Math 1120 (Calc. 2)	Fall 2018, Fall 2019

Grader

Math 4340 (Honors intro. to algebra)	Spring 2016

Graduate Assistant

Summer Program for Undergraduate Research: Topological Methods in Discrete Geometry	Summer 2017

2012-2014	**College of Sciences, Universidad de la República, Uruguay**	
	Teaching assistant	
	Linear algebra I.	Spring 2014
	Algebra I. (Rings and modules)	Fall 2014
	Intro. to computer science (Haskell)	Fall 2013
	Mathematics I (Math for the life sciences)	Spring 2012, Spring 2013
2013-2014	**College of Engineering, Universidad de la República, Uruguay**	
	Teaching assistant	
	Linear algebra and geometry I.	Spring 2014, Fall 2014
	Differential and integral calculus I.	Spring 2013, Fall 2013