Nir Gadish

Personal Data

Current position:	Postdoctoral Assistant Professor and Desapio fellow, University of Michigan
Address:	530 Church St, Ann Arbor, MI 48109
Phone:	(872) 212-2517
email:	gadish@umich.edu

Positions Held

2021-Present	Postdoctoral Assistant Professor, **The University of Michigan**
2020-2021	NSF Postdoctoral associate, **MIT**
2019-2020	NSF Postdoctoral fellow, **MIT**

Education

2013 - 2019	**The University of Chicago**, department of Mathematics Ph.D. received June 2019, M.S. received June 2015. Dissertation: "A general framework for representation stability, with applications to arrangements and arithmetic". Thesis Advisor: Prof. Benson Farb
2008-2012	**Hebrew University of Jerusalem** B.Sc in Mathematics, Physics and Amirim special honors program. Summa cum Laude - Final grade: 98.00% Honors Thesis: "Free differential graded Lie-algebra model of the 2-cell". Honors Thesis Advisor: Prof. Ruth Lawrence

Preprints and Publications

2023	Letter-braiding: a universal bridge between combinatorial group theory and topology, *arXiv:2308.13635*.
2023	A Serre spectral sequence for the moduli space of tropical curves (with C. Bibby, M. Chan and C. Yun), *arXiv:2307.01960* (submitted).
2022	Higher Hochschild cohomology and configurations on graphs (with L. Hainaut), *arXiv:2202.12494* (submitted).
2021	Homology representations of compactified configurations on graphs applied to $M_{2,n}$ (with C. Bibby, M. Chan and C. Yun), *Experimental Mathematics* (2023): 1-13.
2021	Product Expansions of q-Character Polynomials (with A. Balachandran, A. Huang and S. Sun), *J. of Alg. Combinatorics* 57, no. 3 (2023): 975-1005.
2020	Correction to the article A spectral sequence for stratified spaces and configuration spaces of points (with D. Petersen), *Geom. & Top.* Vol. 25(5) (2021): 2699-2706.
2020	Deletion and contraction in configuration spaces of graphs (with S. Agarwal, M. Banks and D. Miyata), *Alg. and Geom. Topology*, DOI:10.2140/agt.2021.21.3663 (2021).
2019	A generating function approach to new representation stability phenomena in orbit configuration spaces (with C. Bibby), *Trans. of the AMS*, Series B 10, no. 09 (2023): 241-287.
2018	Adding points to configurations in closed balls (with L. Chen and J. Lanier), *Proc. of the AMS* (2019).
2018	Combinatorics of orbit configuration spaces (with C. Bibby), *Int. Math. Res. Not.*, DOI:rnaa296 (2020).
2018	Dimension-independent statistics of $Gl_n(F_q)$ via character polynomials, *Proc. of the AMS* (2019).
2017	An explicit symmetric DGLA model of a bi-gon (with I. Griniasty and R. Lawrence), *J. of Knot Theory and its Ramifications*, Vol. 28 (2019).
2017	A trace formula for the distribution of rational G-orbits in ramified covers, adapted to rep. stability, *NY J. of Math*, Vol. 23 (2017): 987-1011.

2016   Categories of FI type: a unified approach to generalizing representation stability and character polynomials, *J. of Algebra,* Vol. 480 (2017): 450-486.

2016   Representation stability for families of linear subspace arrangements, *Adv. in Math,* Vol. 332 (2017): 341-377.

Honors and Awards

2023	B. Alan Taylor Outstanding Postdoctoral Teaching Award, (University of Michigan).
2022	Collaborate@ICERM, (Brown University).
2022-2024	AMS-Simons Travel Grant, (University of Michigan).
2019-2021	NSF Mathematical Sciences Postdoctoral Research Fellowship, (MIT).
2013-2015	McCormick Fellowship, (University of Chicago).
2012	The Dean's Prize for Master students, (Hebrew University of Jerusalem).
2009-2011	"Amirim" special honors program, (Hebrew University of Jerusalem).
2011	Dean's List, (Hebrew University of Jerusalem).
2010	The Rector's Prize, (Hebrew University of Jerusalem).
2009	The Rector's Prize, (Hebrew University of Jerusalem).

Teaching Experience

2021-Present	**The University of Michigan** Director of Lab of Geometry LoG(M) (Math 440). Instructor for Coding and Information theory (Math 567), IBL Topology (Math 490), IBL Probability (Math 310), IBL Calculus I (Math 115).
2019-2021	**Massachusetts Institute of Technology** Lead Instructor for Communications-Intensive(CI) Discrete math (Math 18.204).
2014-2019	**The University of Chicago** Instructor for Calculus I-III (Math 151-153), Math. methods in the Social Sciences (Math 195), IBL Basic Geometry (Math 176), Linear Algebra (Math 196).

	Additional experience
2019-2020	Recitation instructor for MIT's Linear Algebra (Math 18.06).
2018	TA for *UChicago study abroad program in Paris.*
2014-2015	TA for UChicago's Intro. to Algebraic Topology (Math 263), Point-Set Topology (Math 262), Intro. to Representation Theory of finite groups (Math 267).
2010-2012	Junior Instructor for Hebrew University's Applied Mathematics I and II (Math 114, 157), Complex Valued Functions and Applications (Math 314).

Professional Services

2023	Organizer of JMM special session on configuration spaces (JMM 2024 - San Francisco).
2023	Preliminary exam committee member for Urshita Pal, (University of Michigan).
2023-2024	Manager of Israel's Science Abroad community, Michigan branch.
2023-2024	Co-organizer of Combinatorics learning seminar, (University of Michigan).
2015-2016	Co-organizer of the weekly Geom-Top student seminar, (University of Chicago).
2014-2015	Co-organizer of the weekly graduate "Pizza" student seminar, (University of Chicago).
	Reviewer (with multiplicity) for: J. of the AMS, Adv. in Math, NY J. of Math, Geometry and Topology, Algebraic and Geometric Topology, Tran. of the AMS, Proc. of the AMS, American J. of Math, IMRN, Algebraic Combinatorics, and J. of Algebra.

Outreach Activity

Summer 2022	Teacher at *Math Corps at U(M) Summer Camp* – math education for middle school students from underserved communities in the Ann Arbor metropolitan area.
Fall 2021	Mentor at *Math Corps at U(M) Super Saturdays* – math education for middle school students from underserved communities in the Ann Arbor metropolitan area.
Fall 2021	Instructor at *U(M) Math Circles* – recreational math activities for high school students.

2020	Mentor at *MIT PRIMES USA* – advanced math research projects for high school students.
2019	Mentor with *MIT First generation program* – supporting first generation students at MIT.
Apr 2016	Judge at *QED: Chicago's Young Math Symposium*.
Jul 2015	Mentor for the UChicago summer REU projects – in the special program for underrepresented groups.

Student Advising and Mentoring

2023-Present	Supervisor for 'Independent Study' semester, (U. of Michigan): T. Miklethun Undergraduate reading Tim Cochran's *Milnor's concordance invariants*;
2020-2021	Mentor for 'MIT PRIMES USA', (MIT): high school students "Product Expansions of q-Character Polynomials", A. Balachandran, A. Huang, and S. Sun;
2019-2020	Mentor in the '1st Generation Program', (MIT);
2014-2017	Mentor for 'Directed Reading Program', (University of Chicago): K. Gannon, A. Zimmerman, D. Bejarano.
2014-2016	Advisor for summer REU projects, (University of Chicago):
Summer 2016	"The fundamental group and Seifert-Van Kampen's theorem", K. Gallagher; "The Sylow theorems and their applications", A. Idelhaj; "Spectral theory and applications", J. Li.
Summer 2015	"Bundles, Stiefel-Whitney classes, and braid groups", P. Haine; "The topology of spaces of polynomials via vector bundle theory", R. VanWhy.
Summer 2014	"Incompleteness in ZFC", V. Zhang; "Intro. to the Keisler Order", K. Gannon.
2014-2015	'IMPACT' mentor for an incoming international student, (University of Chicago).

Invited Talks and Presentation

Nov 2023	A Serre spectral sequence for tropical moduli spaces, *Geom-Top seminar*, (U. of Maryland)
Oct 2023	Letter-braiding invariants of words in groups, *Topology seminar*, (Northeastern U.)
Oct 2023	Letter-linking - an explicit bridge between group theory and cohomology, *AMS sectional meeting*, (Creighton U., Omaha, NE)
Sep 2023	Letter-braiding invariants of words in groups, *Topology seminar*, (Notre Dame U.)
Aug 2023	Letter-linking - an explicit bridge between combinatorial group theory and cohomology, *Combinatorial Alg. Geom. reunion meeting*, (ICERM)
Jul 2023	A Serre spectral sequence for tropical moduli spaces, *Stability in Topology, Arithmetic and Rep. theory*, (Purdue U.)
Jun 2023	A Serre spectral sequence for tropical moduli spaces, *Congress of Romanian mathematics*, (U. Pitesti)
May 2023	A Serre spectral sequence for tropical moduli spaces, *Workshop on homology of configuration spaces*, (U. Jussieu-Paris)
Feb 2023	(Lots of) Unstable cohomology of moduli spaces of curves with marked points, *Mathematical Physics and Representation Theory seminar*, (Louisiana State U.)
Feb 2023	(Lots of) Unstable cohomology of moduli spaces of curves with marked points, *Topology seminar*, (U. of Minnesota)
Nov 2022	Polynomial representations of automorphism groups of free groups and moduli of curves, *Algebra seminar*, (Tel Aviv U.)
Nov 2022	Representation stability - using category theory to transfer information between representations of varying groups, *Colloquium Series*, (Hebrew U. of Jerusalem)
Oct 2022	Discussing representation stability using category theory, (Tel Aviv U.)
Sep 2022	Configurations on graphs and tropical moduli spaces, *AMS sec. meeting*, (UMass Amherst)
Jun 2022	Polynomiality in configurations on graphs, *Arrangements in Ticino*, (SUPSI Locarno)
Jun 2022	From configurations on graphs to cohomology of $\mathcal{M}_{2,n}$, *Algebra and geometry seminar*, (U. di Bologna)
Jun 2022	Computing top weight cohomology of $\mathcal{M}_{2,n}$ using configurations on graphs, *Algebra/Topology seminar*, (U. of Copenhagen)
May 2022	Möbius inversion in homotopy theory, *Algebraic Topology Seminar*, (Sorbonne Paris Nord)
May 2022	Tropical moduli spaces, configurations on graphs and top weight cohomology of $\mathcal{M}_{2,n}$, *Topology seminar*, (Stockholm U.)

MAR 2022	Polynomiality and stability in configurations on graphs, *Stability in topology, arithmetic, and rep. theory*, (Purdue U.)
MAR 2022	From configurations on graphs to cohomology of $\mathcal{M}_{2,n}$, *55th Spring topology conference*, (Baylor U.)
MAR 2022	Higher Hochschild homology and configurations on graphs, *RATCOW seminar*, (U. of Oregon)
FEB 2022	Inclusion-Exclusion in homotopy theory, *RATCOW seminar*, (U. of Oregon)
FEB 2022	From configurations on graphs to cohomology of $\mathcal{M}_{2,n}$, *Braids in alg. combinatorics*, (ICERM)
FEB 2022	From configurations on graphs to cohomology of $\mathcal{M}_{2,n}$, *Combin. seminar*, (U. of Michigan)
OCT 2021	Configuration spaces of graphs applied to cohomology of $M_{2,n}$, *Compactification, Configurations and Cohomology*, (Northeastern U.)
MAY 2021	Möbius inversion in hömotopy theory, *Arrangements at Home*, (Western Ontario) [virtual]
APR 2021	Möbius inversion in hömotopy theory, *Topology seminar*, (U. of Haifa) [virtual]
APR 2021	Möbius inversion in hömotopy theory, *AlgeCom XXI*, (U. of Notre Dame) [virtual]
APR 2021	Möbius inversion in hömotopy theory, *Topology seminar*, (MIT) [virtual]
OCT 2020	Combinatorics of orbit configuration spaces, *Topology seminar*, (U. of Rochester) [virtual]
APR 2020	The "generating function" of configuration spaces, *Topology seminar*, (Purdue U.) [virtual]
MAR 2020	The "generating function" of configuration spaces, *Combinatorics seminar*, (Brown U.) [virtual]
JAN 2020	Finitely generated diagrams of linear subspace arrangements, *Workshop on Polyhedral Products in Homotopy Theory*, (The Fields Institute)
NOV 2019	Finitely generated diagrams of linear subspace arrangements, *Topology seminar*, (MIT)
SEP 2019	The "generating function" of configuration spaces, *Topology seminar*, (Georgia Tech.)
SEP 2019	The "generating function" of configuration spaces, *Topology seminar*, (Northeastern U.)
JUL 2019	From the topology of the space of polynomials to insolvability, *GA-Tech REU*, (Georgia Tech.)
JUN 2019	The "generating function" of configuration spaces, *Arrangements at Western*, (Western Ontario)
APR 2019	The "generating function" of configuration spaces, *Midwest rep. stability workshop*, (Chicago)
APR 2019	The "generating function" of configuration spaces, *Topology meeting*, (Stockholm U. and KTH)
FEB 2019	Combinatorics of orbit configuration spaces, *Topology RTG seminar*, (U. of Michigan)
JAN 2019	Finitely generated families of arrangements, *Topology seminar*, (U. of Copenhagen)
OCT 2018	Finitely generated families of arrangements, *Topology seminar*, (U. of Minnesota)
SEP 2018	Combinatorics of representation stability, *Combinatorics preseminar*, (MIT)
SEP 2018	Finitely generated families of arrangements, *GASC seminar*, (Northeastern University)
SEP 2018	Stable character theory, *Algebra seminar*, (Weizmann Institute)
AUG 2018	Stable character theory, *Algebra seminar*, (Bar Ilan U.)
JUNE 2018	Finitely generated families of arrangements, *Roots of Topology*, (U. of Chicago)
MAY 2018	Finitely generated families of arrangements, *Topology seminar*, (U. de Strasbourg)
MAY 2018	Finitely generated families of arrangements, *Topology seminar*, (U. de Montpellier)
MAR 2018	Finitely generated families of arrangements, *Topology seminar*, (U. de Rennes 1)
MAR 2018	Finitely generated families of arrangements, *Algebra seminar*, (UC Irvine)
MAR 2018	Finitely generated families of arrangements, *Representation stability seminar*, (U. of Michigan)
OCT 2017	Finitely generated families of arrangements, *No Boundaries: Farbfest*, (U. of Chicago)
SEP 2017	Lifting finite generation to the space level, *Topology seminar*, (Purdue U.)
JUL 2017	Finitely generated families of arrangements, *Math. Congress of the Americas*, (McGill University)
JUL 2017	Stability patterns in representation theory, *'Amitsur' algebra seminar*, (Hebrew U. of Jerusalem)
JUN 2017	Stability patterns in representation theory, (Tel Aviv University)
APR 2017	Categories of FI-type: generalizing rep. stability, *AMS sec. meeting*, (University of Indiana)
SEP 2016	Rep. stability of families of linear subspace arrangements, *AMS sec. meeting*, (Bowdoin College)