



Co-organizers: David Rosenthal and Andrew Nicas.  
Funded by the Fields Institute, Toronto, Canada.

## Professional Memberships

- 2016 – 2022: GEAR Network (Geometric Structures and Representation Varieties).  
This program was funded by a \$5M grant from the U.S. National Science Foundation's Research Networks in Mathematical Sciences program.
- 2009 – present: Mathematical Association of America
- 2003 – present: American Mathematical Society

## Academic Honors

- 2019 Trustees Teaching Award, IUPUI
- 2015 Bernie Morrell Teaching Award, Department of Mathematical Sciences, IUPUI
- 2002 Kieval Prize, Department of Mathematics, Cornell University
- 1998 – 2002 Cornell Presidential Research Scholar

## Publications and Submitted Work

1. (with Clément Guérin and Sean Lawton) *Bad Representations and Homotopy of Character Varieties*. Ann. H. Lebesgue 5 (2022), 93–140. arXiv:1908.02915
2. (with Mentor Stafa) *Homological stability for spaces of commuting elements in Lie groups*. Int. Math. Res. Not. IMRN 2021, no. 5, 3927–4002. arXiv:1805.01368
3. (with Bernardo Villarreal) *Commutative cocycles and stable bundles over surfaces*. Forum Math. 31 (2019), no. 6, 1395–1415. arXiv:1807.03736
4. (with Indranil Biswas and Sean Lawton) *Wonderful compactification of character varieties. With an Appendix by Arlo Caine and Sam Evens*. Pacific J. Math. 302 (2019), no. 2, 413–435. arXiv:1703.04431
5. *The homotopy groups of a homotopy group completion*. Israel J. Math. 234 (2019), no. 1, 81–124. arXiv:1807.02613
6. (with Mentor Stafa) *Hilbert-Poincaré series for spaces of commuting elements in Lie groups*. Math. Z. 292 (2019) no. 1–2, 591–610. arXiv:1704.05793
7. (with Bobby Ramsey) *Extending properties to relatively hyperbolic groups*. Kyoto J. Math. 59 (2019), no. 2, 343–356. arXiv:1410.0060
8. *Orbit categories, classifying spaces, and generalized homotopy fixed points*. J. Homotopy Relat. Struct. 13 (2018), no. 1, 237–249. arXiv:1507.06112
9. (with Lisa Jeffrey and Jonathan Weitsman) *The prequantum line bundle on the moduli space of flat  $SU(N)$  connections on a Riemann surface and the homotopy of the large  $N$  limit*. Lett. Math. Phys. 107 (2017), no. 9, 1581–1589. arXiv:1411.4360
10. (with David Pengelley) *How efficiently can one untangle a double-twist? Waving is believing!* The Math. Intelligencer, 39 (2017), no. 1, 27–40. Erratum: Math. Intelligencer 39 (2017), no. 2, 107. Animations: <http://www.math.iupui.edu/~dramras/double-tip.html>
11. (with Carlos Florentino and Sean Lawton) *Homotopy groups of free group character varieties*. Ann. Sc. Norm. Super. Pisa Cl. Sci. 17(1) (2017), 143–185. arXiv:1412.0272
12. (with Indranil Biswas and Sean Lawton) *Fundamental groups of character varieties: surfaces and tori*. Math. Z., 281(1-2):415–425, 2015. arXiv:1412.4389

13. (with Sean Lawton) *Covering spaces of character varieties*. New York J. Math., 21:383–416, 2015. With an Appendix by Ho and Liu. arXiv:1402.0781
14. (with Thomas Baird) *Smoothing maps into algebraic sets and spaces of flat connections*. Geom. Dedicata, 174:359–374, 2015. arXiv:1206.3341
15. (with Romain Tessera and Guoliang Yu) *Finite decomposition complexity and the integral Novikov conjecture for higher algebraic K-theory*. J. reine angew. Math. (Crelle’s Journal) 694 (2014), 129–178. With an Addendum, to appear in Crelle (published Online: 09/12/2017). arXiv:1111.7022
16. *Periodicity in the stable representation theory of crystallographic groups*. Forum Math. 26 (2014), no. 1, 177–219. arXiv:1007.0406
17. (with Rufus Willett and Guoliang Yu) *A finite dimensional approach to the strong Novikov conjecture*. Algebr. Geom. Topol. 13 (2013), no. 4, 2283–2316. arXiv:1203.6168
18. *The stable moduli space of flat connections over a surface*. Trans. Amer. Math. Soc. 363 (2011), no. 1, 1061–1100. arXiv:0810.1784
19. *Invariant tubular neighborhoods in infinite-dimensional Riemannian geometry, with applications to Yang-Mills theory*. Arch. Math. (Basel) 96 (2011) no. 6, 589–599. arXiv:1006.0063
20. *On the Yang–Mills stratification for surfaces*. Proc. Amer. Math. Soc. 139 (2011), no. 5., 1851–1863. arXiv:0805.2587
21. (with Nan-Kuo Ho and Chiu-Chu Melissa Liu) *Orientability in Yang-Mills theory over nonorientable surfaces*. Comm. Anal. Geom. 17 (2009), no. 5, 903–954. arXiv:0810.4882
22. *Yang–Mills theory over surfaces and the Atiyah–Segal theorem*. Algebr. Geom. Topol. 8 (2008) 2209–2251. arXiv:0710.0681
23. *Excision in deformation K-theory*. Algebr. Geom. Topol. 7 (2007), 2239–2270. arXiv:math/0703463
24. *Connectivity of the coset poset and the subgroup poset of a group*. J. Group Theory 8 (2005), no. 6, 719–746. arXiv:math/0210001
25. (with Anant Godbole and Sam Greenberg) *Cliques and independent neighbor sets in random graphs*. Proceedings of the Thirty-second Southeastern International Conference on Combinatorics, Graph Theory and Computing (Baton Rouge, LA, 2001), Congr. Numer. 153 (2001), 113–128.

## Work in Progress

1. (w/ C. Neuffer) Dynamical induction and cohomology of crystallographic groups. Work in progress.
2. *Variations on the Nerve Theorem*. Work in progress.
3. *A combinatorial viewpoint on regular neighborhoods in simplicial complexes*. Work in progress.
4. *Homotopy groups in Algebraic Quantum Field Theory*. Work in progress.
5. *Fine covers and homotopy groups*. Work in progress.
6. *The topological Atiyah–Segal map*. Preprint, 2016; updated Fall 2022. Submitted.

## Editorial positions

Guest editor, Tbilisi Mathematical Journal, Special issue on Homotopy Theory, Spectra and Structured Ring Spectra, 2020. With John Harper (Lead editor), Gregory Arone, David Barnes, Mark Behrens, Kathryn Lesh, Cary Malkiewich, and, Kirsten Wickelgren.

## Doctoral Students

Andy Davis, 2022–present.

Chris Neuffer, Ph.D., 2018–2021. Dissertation title: Genera of Integer Representations and the Lyndon–Hochschild–Serre Spectral Sequence.

Virgil Chan, Ph.D., 2015–2020. Dissertation title: An Explicit Formula for the Loday Assembly Map.

## Undergraduate Research Projects Supervised

Katie Hamill, Fall 2020. Capstone project: *Persistent homology*.

Clay Kellog, Summer 2016. *Representations of crystallographic groups*.

Harrison Hicks, Spring 2016. *Face vectors of simplicial spheres*.

Chris Neuffer, Spring and Summer 2014. *Crystallographic groups*.

Jonah Wyatt, Fall 2011–Summer 2012. *Homotopy theory for graphs*.

Funded in part by NSF grant DMS-1057557 (P.I. Ramras).

Mychael Sanchez, Spring 2010–Spring 2011. *Homology of Hom complexes*. Rose-Hulman Undergrad. Math. J. 13 (2012), 212–223. Funded in part by NSF grants DMS-0968766/1057557 (P.I. Ramras)