

Craig Westerland

Curriculum Vitæ

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Personal

- **Citizenship:** United States.
- **Born:** 4 August, 1977 in Tarrytown, NY, USA.

Employment

- **Associate Professor**, University of Minnesota, September 2017 – present.
- **Assistant Professor**, University of Minnesota, August 2013 – August 2017.
- **Senior Lecturer**, University of Melbourne, Australia. January 2013 – March 2014.
- **Future Fellow**, funded by the Australia Research Council, 2011 – 2014.
- **Lecturer**, University of Melbourne, Australia. August 2008 – January 2013.
- **VIGRE Van Vleck Visiting Assistant Professor**, University of Wisconsin, Madison, WI. August 2005 – August 2008.
- **Postdoctoral Fellow**, University of Copenhagen, Denmark. July 2007 – December 2007.
- **Member**, Mathematical Sciences Research Institute, Berkeley, CA. Program: “New Topological Structure in Physics.” January 2006 – June 2006.
- **Member**, Institute for Advanced Study, Princeton, NJ. September 2004 – June 2005.

Education

- **University of Michigan**, Ann Arbor, MI. Ph.D. in Mathematics, May 2004. Thesis title: *Stable splittings of configuration spaces of surfaces and related mapping spaces*. Advisor: Igor Kriz.
- **Williams College**, Williamstown, MA. B.A. (*magna cum laude*) in Mathematics (with Honors) and Astrophysics, June 1999.

Publications and Preprints

1. with Jordan Ellenberg and TriThang Tran, *Fox-Neuwirth-Fuks cells, quantum shuffle algebras, and Malle’s conjecture for function fields*. Preprint: arXiv:1701.04541.
2. *A higher chromatic analogue of the image of J* . *Geometry and Topology* 21 (2017), no. 2, 1033–1093.
3. with John Lind and Hisham Sati, *A higher categorical analogue of topological T-duality for sphere bundles*. Preprint: arXiv:1601.06285.
4. with Jordan Ellenberg and Akshay Venkatesh, *Homological stability for Hurwitz spaces and the Cohen-Lenstra conjecture over function fields*. *Annals of Mathematics*, 183 (2016), no. 3, 729 – 786.
5. with Nathalie Wahl, *Hochschild homology of structured algebras*. *Advances in Mathematics* 288 (2016), 240 – 307.

6. with Hisham Sati, *Twisted Morava K-theory and E-theory*. *Journal of Topology* 8 (2015), no. 4, 887 – 916.
7. *Topological T-duality is twisted Atiyah duality*. Preprint: arXiv:1503.00210 (2015).
8. *Operads of moduli spaces of points in \mathbb{C}^d* . *Proceedings of the American Mathematical Society*, 141 (2013), no. 9, 3029–3035.
9. *Configuration spaces in topology and geometry*, *Gazette of the Australian Mathematical Society*, 38 (2011), no. 5, 279–283.
10. with Igor Kriz and Joshua Levin, *The symplectic Verlinde algebras and string K-theory*, *Journal of Topology*, 3 (2010), no. 4, 901–936.
11. with Kate Gruher, *String topology prospectra and Hochschild cohomology*, *Journal of Topology*, 1 (2008), no. 4, 837–856.
12. *Equivariant operads, string topology, and Tate cohomology*, *Mathematische Annalen*, 340 (2008), no. 1, 97–142.
13. *String homology of spheres and projective spaces*, *Algebraic & Geometric Topology* 7 (2007) 309 – 325.
14. *Stable splittings of surface mapping spaces*, *Topology and its Applications* 153 (2006), 2834 – 2865.
15. *Dyer-Lashof operations in the string topology of spheres and projective spaces*, *Mathematische Zeitschrift* 250 (2005), no. 3, 711–727.

Awards and Fellowships

- **Medal and Fellow** of the Australian Mathematical Society, 2013.
- **Visiting scholar positions**
 - University of Chicago: 25 March – 5 May, 2013
 - Mathematical Research Sciences Institute: January 2014 – March 2014; “Algebraic Topology”
- **Simons Visiting Professorship**: Oberwolfach, Copenhagen, September 2014 (Simons Foundation).
- **NSF Standard Grant**, “Topological methods in arithmetic and algebra,” DMS-1712470, University of Minnesota, July 1, 2017 to June 30, 20120.
- **NSF Standard Grant**, “Homotopy theory and arithmetic: a dialogue,” DMS-1406162, University of Minnesota, July 1, 2014 to June 30, 2017.
- **ARC Future Fellowship**, “Topology through applications: geometry, number theory, and physics,” FT100100307, University of Melbourne, 2011 – 2014.
- **ARC Discovery Grant**, “Homotopy theory: interactions with representation theory and moduli spaces,” DP1095831, University of Melbourne, 2010 – 2012.
- **Early Career Researcher Grant**, University of Melbourne, 2010.
- **NSF Standard Grant**, “Moduli Spaces and Algebraic Structures in Homotopy Theory,” DMS-0705428, University of Wisconsin, August 15, 2007 to July 31, 2010.
- **Rackham Dissertation Fellow**, University of Michigan, Winter 2003.
- **NSF VIGRE Graduate Fellow**, University of Michigan, September 2000 – August 2003.
- **Member** of the American Mathematical Society and Australian Mathematics Society.

Conference and seminar organization

- **Conference Co-organizer:**

- Special session on topology and arithmetic, AMS meeting, Minneapolis, 28-30 October, 2016.
- Special session on algebraic topology, 2nd PRIMA Congress, Shanghai, June, 2013.
- *Group-valued moment maps with applications to mathematics and physics*, Institute for Geometry and its Applications, Adelaide, 5 – 9 Sep., 2011.
- Special session on geometry and topology, 55th meeting of the Australian Mathematics Society, University of Wollongong, 26 – 29 Sep., 2011.
- Special session on geometry and topology, 53rd meeting of the Australian Mathematics Society, University of South Australia, 28 Sep. – 1 Oct., 2009.
- Special session on stringy topology, 1st PRIMA Congress, UNSW, Sydney, 6 – 10 July, 2009.
- *Conference on mapping class groups and operads*, University of Copenhagen, 3 – 7 Sep., 2007.

- **Seminar Organizer:**

- Algebraic Topology Seminar, University of Minnesota, July 2014 – present.
- Algebra-Geometry-Topology Seminar, University of Melbourne, July 2009 – July 2013.
- Postdoc Seminar and Postdoc Topology Seminar, MSRI, Spring 2006.

Teaching

- **University of Minnesota.**

- Manifolds and Topology (Math 8301-8302), Academic year 2017-2018.
- Topics in Topology (Math 8360), Fall 2015.
- Calculus II (Math 1272), Spring 2015, Spring 2016, Fall 2016.
- Algebraic Topology II (Math 8307), Spring 2015.
- Topology (Math 5354H), Fall 2013, Fall 2017.

- **University of Melbourne.**

- Complex Analysis (MAST30021), Semester II, 2012.
- Reading seminar: Homotopy theory, Semester I, 2012.
- Geometry (MAST30024), Semester II, 2010, 2011.
- Reading seminar: Spectral sequences, Semester I, 2011.
- Linear Algebra (MAST10007), Semester II, 2010.
- Algebraic Topology (620-634) Semester I, 2009, 2010.
- Topology (620-322), Semester II, 2009.
- Differential Geometry (620-427), Semester II, 2008.

- **University of Copenhagen.** Introduction to String Topology, Fall 2007.

- **University of Wisconsin-Madison.**

- Introductory Topology I and II (Math 751 and 752), Fall 2005, Spring 2007, Spring 2008.
- Reading course on Characteristic Classes, Spring 2007.
- Graduate Summer Enhancement Program in Topology, Summer 2005, 2006.
- Calculus I (Math 221), Fall 2005, 2006.

- **University of Michigan.**

- Calculus I (Math 115), Fall 2001.
- Precalculus (Math 105), Fall 1999, Winter 2000.

Postgraduate and Postdoctoral Supervision

- Jacobien Carstens, *Twisted K-theory and T-duality*, Master of Science, U. Amsterdam, 2009.
- Sam Chow, *An introduction to algebraic number theory and the class number formula*, Bachelor of Science (Honours), University of Melbourne, 2011.
- Omar Ortiz, *Homogeneous spaces of p-compact groups*, Doctor of Philosophy, University of Melbourne, 2013, jointly supervised with Arun Ram.
- Trithang Tran:
 - *A configuration of homological stability results*, PhD, University of Melbourne, 2014.
 - *Mapping class groups and Lefschetz fibrations*, Bachelor of Science (Honours), University of Melbourne, 2010.
- Drew Heard, *Morava modules and the $K(n)$ -local Picard group*, PhD, University of Melbourne, 2014.
- Jeffrey Bailes:
 - *Orbispaces, Configurations and Quasi-fibrations*, PhD, University of Melbourne, 2015.
 - *Cohen-Lenstra heuristics and the cohomology of the braid group*, Master of Science, University of Melbourne, 2011.
- Current PhD supervision at University of Minnesota: Jun-Yong Park, Shelley Kandola, Greg Michel.
- Postdocs at University of Melbourne: Paul Sobaje (2011-2014), Tarje Bargheer (2011-2013).
- Postdocs at University of Minnesota: Saul Glasman (2016-2019), Weiyang Chen (2017-2020).

Invited Lectures and Conferences

- *Braids in algebra, geometry and topology*, ICMS, Edinburgh, Scotland, 22-26 May 2017.
- *Topology in Australia and South Korea*, University of Melbourne, Australia, 1-5 May 2017
- *Invertibility and duality in derived algebraic geometry and homotopy theory*, University of Regensburg, Germany, 3-7 April 2017.
- *Topologie*, Oberwolfach, Germany, 17-23 October 2016, 14-20 September 2014, and 16-22 September 2012.
- *Operations in Highly Structured Homology Theories*, Banff International Research Station, Canada, 22-27 May 2016.
- *Midwest Topology Seminar*, Northwestern University 6-7 February 2016, Wayne State University, 5 October 2013, Indiana University, 22 October 2006.
- *Higher structures and cohomology theories*, University of Pittsburgh, 28-29 March, 2015
- *Homotopy theory*, Oberwolfach, Germany, 8-14 March, 2015.
- 8th *Australia-New Zealand Mathematics Convention*, Melbourne, Australia, 8-12 December 2014.
- *Loop spaces in geometry and topology*, University of Nantes, 1-5 September, 2014
- *Introductory Workshop on Algebraic Topology*, Mathematical Sciences Research Institute, 27-31 January, 2014.
- *Workshop and Masterclass on Homological stability*, The University of Copenhagen, 26-30 August, 2013
- *Baumfest*, Australian National University, 12-14 December, 2012.
- *Algebraic Topology: applications and new directions*. Stanford Symposium July 23-27, 2012.
- *Group-valued moment maps with applications to mathematics and physics*, Institute for Geometry and its Applications, Adelaide, 5 – 9 Sep., 2011.
- *The Cohen-Lenstra heuristics for class groups*, American Institute of Mathematics, Palo Alto, CA, USA, 13-17 June, 2011.

- *Dirac Operators in Geometry, Topology, Representation Theory, and Physics*, Institute for Geometry and its Applications, Adelaide, Australia, 18 – 22 October 2010.
- *54th and 55th Annual Meetings of the Australian Mathematical Society*, 2010, 2011.
- *Mathematics and Physics on the Borderline between Algebraic and Differential Geometry*, Canberra, Australia, 26 – 30 July 2010.
- *Algorithms, Algebra and Analysis in Four Dimensions*, Brisbane, Australia, 20 – 21 July 2010.
- *Geometry, Quantum Fields, and Strings: Categorical Aspects*, Oberwolfach, Germany, 6 – 12 June, 2010.
- *Workshop on New Currents in Geometry in Australia*, Adelaide, 18 November, 2009.
- *First PRIMA Conference*, Sydney, Australia, July 6 – 10, 2009.
- *26th and 27th Victorian Algebra Conferences*, Melbourne, Australia, October 2 – 3, 2008, November 5 – 6, 2009.
- *Young persons workshop on string topology and the topology of moduli spaces*, Stanford University, 24 – 27 July, 2008.
- *Hochschild and cyclic (co-)homology and applications to geometry and physics*, Max-Planck Institute, Bonn, 17 July, 2007.
- *Algebraic Topology: Old and New; M. M. Postnikov Memorial Conference*, Bedlewo, Poland. 19 June, 2007.
- *First Copenhagen Topology Conference*, Copenhagen, Denmark. 5 Sept. 2006.
- Lewis and Clark College Summer REU, Portland, OR. 20 June 2006.
- *Stringy Topology in Morelia*, Morelia, Mexico. 16 Jan. 2006.
- *Stable and Algebraic Homotopy*, Schloss Ringberg, Germany. 2 Nov. 2005.
- Numerous colloquia, topology/geometry seminars, and meetings in Australia, Europe, and North America.