

Steven Sivek

CONTACT INFORMATION	Max Planck Institute for Mathematics Vivatsgasse 7 53111 Bonn, Germany	<i>Email:</i> s.sivek@imperial.ac.uk <i>WWW:</i> www.ma.imperial.ac.uk/~ssivek
RESEARCH INTERESTS	Low-dimensional topology, contact and symplectic geometry, Floer homology, gauge theory	
EDUCATION	Ph.D. in Mathematics , Massachusetts Institute of Technology • Thesis: Bordered Legendrian knots and sutured Legendrian invariants • Advisor: Tomasz Mrowka	6/2006–6/2011
	S.B. in Mathematics , Massachusetts Institute of Technology	9/2002–6/2006
	S.B. in Computer Science , Massachusetts Institute of Technology	9/2002–6/2006
EMPLOYMENT	Research Group Leader (tenured), Max Planck Institute for Mathematics	9/2022–present
	Reader , Department of Mathematics, Imperial College London	9/2022–present
	Senior Lecturer , Department of Mathematics, Imperial College London	9/2019–8/2022
	Lecturer , Department of Mathematics, Imperial College London	8/2017–8/2019
	Professurvertreter , Mathematical Institute, University of Bonn	10/2016–3/2017
	Instructor / NSF Postdoctoral Fellow , Department of Mathematics, Princeton University	9/2013–7/2016
	NSF Postdoctoral Fellow , Department of Mathematics, Harvard University	7/2012–8/2013
	Postdoctoral Fellow , Department of Mathematics, Harvard University	7/2011–6/2012
VISITING POSITIONS	Max Planck Institute for Mathematics, Bonn	9/2016, 4/2017–7/2017
	Chinese University of Hong Kong	6/2014
	Simons Center for Geometry and Physics	5/2013
PUBLICATIONS	<ol style="list-style-type: none">1. Characterizing slopes for 5_2 (with John A. Baldwin), arXiv:2209.09805, 54 pp.2. Floer homology and non-fibered knot detection (with John A. Baldwin), arXiv:2208.03307, 65 pp.3. Framed instanton homology and concordance, II (with John A. Baldwin), arXiv:2206.11531, 40 pp.4. Floer homology and right-veering monodromy (with John A. Baldwin and Yi Ni), arXiv:2204.04093, 29 pp.5. Small Dehn surgery and $SU(2)$ (with John A. Baldwin, Zhenkun Li, and Fan Ye), <i>Geom. Topol.</i>, to appear; arXiv:2110.02874, 28 pp.6. Khovanov homology and the cinquefoil (with John A. Baldwin and Ying Hu), <i>J. Eur. Math. Soc.</i>, to appear; arXiv:2105.12102, 20 pp.7. Instanton L-spaces and splicing (with John A. Baldwin), <i>Ann. Henri Lebesgue</i>, to appear; arXiv:2103.08087, 16 pp.8. Instanton Floer homology of almost rational plumbings (with Antonio Alferi, John A. Baldwin, and Irving Dai), <i>Geom. Topol.</i>, to appear; arXiv:2010.03800, 41 pp.	

9. Framed instanton homology and concordance (with John A. Baldwin), *J. Topology* 14 (2021), no. 4, 1113–1175.
10. Surgery obstructions and character varieties (with Raphael Zentner), *Trans. Amer. Math. Soc.* 375 (2022), no. 5, 3351–3380.
11. L-space knots are fibered and strongly quasipositive (with John A. Baldwin), *The Open Book Series*, to appear; arXiv:1911.01866, 12 pp.
12. Instantons and L-space surgeries (with John A. Baldwin), *J. Eur. Math. Soc.*, to appear; arXiv:1910.13374, 79 pp.
13. A menagerie of $SU(2)$ -cyclic 3-manifolds (with Raphael Zentner), *Int. Math. Res. Not.* 2022, no. 11, 8038–8085.
14. Khovanov homology detects the Hopf links (with John A. Baldwin and Yi Xie), *Math. Res. Lett.* 26 (2019), no. 5, 1281–1290.
15. Representations, sheaves, and Legendrian $(2, m)$ torus links (with Baptiste Chantraine and Lenhard Ng), *J. Lond. Math. Soc.* 100 (2019), no. 1, 41–82.
16. Khovanov homology detects the trefoils (with John A. Baldwin), *Duke Math. J.* 171 (2022), no. 4, 885–956.
17. $SU(2)$ -cyclic surgeries and the pillowcase (with Raphael Zentner), *J. Differential Geom.* 121 (2022), no. 2, 101–185.
18. On the complexity of torus knot recognition (with John A. Baldwin), *Trans. Amer. Math. Soc.* 371 (2019), no. 6, 3831–3855.
19. Stein fillings and $SU(2)$ representations (with John A. Baldwin), *Geom. Topol.* 22 (2018), no. 7, 4307–4380.
20. On the equivalence of contact invariants in sutured Floer homology theories (with John A. Baldwin), *Geom. Topol.* 25 (2021), no. 3, 1087–1164.
21. The cardinality of the augmentation category of a Legendrian knot (with Lenhard Ng, Dan Rutherford, and Vivek Shende), *Math. Res. Lett.* 24 (2017), no. 6, 1845–1874.
22. Fillings of unit cotangent bundles (with Jeremy Van Horn-Morris), *Math. Ann.* 368 (2017), no. 3–4, 1063–1080.
23. Quasi-alternating links with small determinant (with Tye Lidman), *Math. Proc. Cambridge Philos. Soc.* 162 (2017), no. 2, 319–336.
24. Augmentations are sheaves (with Lenhard Ng, Dan Rutherford, Vivek Shende, and Eric Zaslow), *Geom. Topol.* 24 (2020), no. 5, 2149–2286.
25. Obstructions to Lagrangian concordance (with Christopher R. Cornwell and Lenhard Ng), *Algebr. Geom. Topol.* 16 (2016), no. 2, 797–824.
26. Contact structures and reducible surgeries (with Tye Lidman), *Compositio Math.* 152 (2016), no. 1, 152–186.
27. Instanton Floer homology and contact structures (with John A. Baldwin), *Selecta Math.* 22 (2016), no. 2, 939–978.
28. Invariants of Legendrian and transverse knots in monopole knot homology (with John A. Baldwin), *J. Symplectic Geom.* 16 (2018), no. 4, 959–1000.
29. A contact invariant in sutured monopole homology (with John A. Baldwin), *Forum of Math. Sigma* 4 (2016), e12, 82 pp.
30. Sutured ECH is a natural invariant (with Çağatay Kutluhan; appendix by C. H. Taubes), *Mem. Amer. Math. Soc.* 275 (2022), no. 1350, iii+136pp.
31. Naturality in sutured monopole and instanton homology (with John A. Baldwin), *J. Differential Geom.* 100 (2015), no. 3, 395–480.

32. Donaldson invariants of symplectic manifolds, *Int. Math. Res. Not.* 2015, no. 6, 1688–1716.
33. Monopole Floer homology and Legendrian knots, *Geom. Topol.* 16 (2012), no. 2, 751–779.
34. The contact homology of Legendrian knots with maximal Thurston-Bennequin invariant, *J. Symplectic Geom.* 11 (2013), no. 2, 167–178.
35. A bordered Chekanov-Eliashberg algebra, *J. Topology* 4 (2011), no. 1, 73–104.
36. On the \mathcal{S}_n -modules generated by partitions of a given shape (with Daniel Kane), *Electron. J. Combin.* 15 (2008), #R111.
37. Some plethysm results related to Foulkes’ conjecture, *Electron. J. Combin.* 13 (2006), #R24.

PHD ADVISING	· Angela Wu, “Obstructing Lagrangian concordance for closures of 3-braids”	2017–2021
	· Bruno Roso, “Seiberg–Witten Floer spectra and contact structures”	2018–
	· Roberto Ladu, “Protocorks and monopole Floer homology”	2018–
	· Laura Wakelin, in progress	2019–
	· Lucy Phillips, in progress	2020–

AWARDS AND HONORS	· Fellowship of the Higher Education Academy (FHEA)	August 2019
	· NSF grant DMS-1506157 (\$159,464)	2015–2016
	· NSF Mathematical Sciences Postdoctoral Research Fellowship (DMS-1204387)	2012–2015
	· Charles and Jennifer Johnson Prize, MIT Department of Mathematics	2011
	Awarded for an outstanding publication by a graduate student	
	· NSF Graduate Research fellow	2006–2011
	· National Defense Science and Engineering Graduate (NDSEG) fellow	2006–2009
	· MIT Phi Beta Kappa	2006
	· Rank 17–24, William Lowell Putnam Mathematics Exam	2005
Honorable mention in 2002 and 2004		
· Bronze medal, International Olympiad in Informatics	2001	

TEACHING	· Analysis 1 (MATH40002), Imperial College	Spring 2022
	· Analysis 1 (MATH40002), Imperial College	Spring 2021
	· Geometry 2: Algebraic Topology (MATH96033/97042/97151), Imperial College	Spring 2021
	· Analysis 1 (MATH40002), Imperial College	Spring 2020
	· The Geometry of Curves and Surfaces (M3P5), Imperial College	Autumn 2017
	· Symplectic Geometry (V5D3, graduate), University of Bonn	Winter 2016–17
	· Mapping Class Groups (S4D3, graduate seminar), University of Bonn	Winter 2016–17
	· Linear Algebra (MAT202), Princeton University (two sections)	Spring 2016
	· Calculus II (MAT104), Princeton University (co-course head)	Fall 2015
	· Morse Theory (MAT983, junior seminar), Princeton University	Spring 2015
	· Algebra I (MAT345), Princeton University	Fall 2014
	· Contact 3-manifolds (3-week minicourse), Chinese University of Hong Kong	June 2014
	· Multivariable Calculus (MAT201), Princeton University (co-course head)	Spring 2014
	· Multivariable Calculus (MAT201), Princeton University	Fall 2013
· Contact Geometry in 3 Dimensions (Math 273, graduate), Harvard University	Spring 2012	

	· Linear Algebra (18.06), MIT (recitation instructor)	Fall 2009
INVITED TALKS	· Symplectic Monday Seminar, IBS Center for Geometry and Physics (virtual)	May 16, 2022
	· Braids in low-dimensional topology, ICERM	April 29, 2022
	· Differential Geometry and Topology Seminar, University of Cambridge	March 2, 2022
	· The Archimedean (maths society), University of Cambridge (virtual)	February 18, 2022
	· Geometry and topology seminar, CIRGET, Montreal (virtual)	December 3, 2021
	· ECM mini-symposium on low-dimensional topology (virtual)	June 21, 2021
	· Symplectix seminar, Institut Henri Poincaré / Nantes–Orsay (virtual)	June 18, 2021
	· University of Bonn, colloquium	May 4, 2021
	· British Mathematical Colloquium 2021 (virtual), workshop on topology	April 6, 2021
	· AMS Spring Eastern Virtual Sectional Meeting, Special session on gauge theory, geometry, and low-dimensional topology	March 20–21, 2021
	· FIM Lecture, ETH Zürich	October 16, 2020
	· Nearly Carbon Neutral Geometric Topology 2020 (conference), ncngt.org	June 1–14, 2020
	· Low-dimensional topology, University of Oxford	January 7, 2020
	· Arbeitstagung on foliations and 3-manifolds, Universität Regensburg	October 25, 2019
	· Pseudoholomorphic curves and gauge theory in low-dimensional topology (LMS Durham symposium), Durham University	August 23, 2019
	· Frontiers in Floer homology, Boston College	July 29, 2019
	· Institut Camille Jordan (Lyon), Séminaire Géométries	June 7, 2019
	· California Institute of Technology, Geometry and topology seminar	April 17, 2019
	· Symplectix seminar, Institut Henri Poincaré, Paris	February 8, 2019
	· Clifford Lectures (conference), Tulane University	January 25, 2019
	· Gauge Theory and Applications (conference), Regensburg, Germany	July 23, 2018
	· Gauge Theory and Applications (summer school), 4-hour minicourse, Regensburg, Germany	July 17–20, 2018
	· Université libre de Bruxelles, Geometry seminar	March 6, 2018
	· University of Glasgow, Geometry and topology seminar	February 5, 2018
	· Computation in geometric topology, University of Warwick	December 15, 2017
	· Nantes-Orsay seminar on symplectic and contact geometry, Nantes	December 8, 2017
	· Imperial College, Geometry and topology seminar	December 1, 2017
	· University of Oxford, Topology seminar	November 27, 2017
	· University of Cambridge, Differential geometry and topology seminar	November 15, 2017
	· Universität Regensburg, LKS-Seminar	November 9, 2017
	· Durham University, Pure maths colloquium	October 30, 2017
	· Low dimensional topology and gauge theory, Casa Matemática Oaxaca	August 9, 2017
	· Max Planck Institute for Mathematics, Mini-workshop on instantons (2 talks)	July 25, 2017
	· Low dimensional topology on Skye, Isle of Skye, Scotland	June 16, 2017
	· University at Buffalo, Geometry and topology seminar	May 12, 2017
	· Berlin-Hamburg symplectic geometry seminar, HU Berlin	April 24, 2017

- Universität Heidelberg, Über-Seminar “Physikalische Mathematik” February 13, 2017
- Workshop on contact and symplectic topology (CAST), Université de Nantes January 28, 2017
- Universität München, Oberseminar Geometrie December 13, 2016
- Universität Regensburg, Oberseminar Globale Analysis November 9, 2016
- Max Planck Institute for Mathematics, Bonn, Topology seminar October 24, 2016
- 12th William Rowan Hamilton Geometry & Topology Workshop,
Hamilton Mathematics Institute, Trinity College Dublin August 25, 2016
- Interactions of gauge theory with contact and symplectic topology in
dimensions 3 and 4, Banff International Research Station March 24, 2016
- University of Wisconsin, Colloquium January 28, 2016
- University of Washington, Colloquium January 25, 2016
- University of Toronto, Colloquium January 21, 2016
- Michigan State University, Colloquium January 18, 2016
- University of California, San Diego, Colloquium January 12, 2016
- University of Illinois at Urbana-Champaign, Colloquium January 11, 2016
- Boston College, Colloquium December 17, 2015
- University of Texas at Austin, Geometry seminar December 15, 2015
- University of Michigan, Geometry seminar December 11, 2015
- University of Pennsylvania, Colloquium December 9, 2015
- Rice University, Colloquium December 8, 2015
- University of Minnesota, Colloquium December 3, 2015
- University of Southern California, Colloquium November 23, 2015
- University of Notre Dame, Colloquium November 17, 2015
- AMS Fall Central Sectional Meeting, Special session on geometric
perspectives in knot theory, Chicago, IL October 3, 2015
- Rutgers University, Seminar on geometry, symmetry, and physics September 24, 2015
- Columbia University, Symplectic Geometry, Gauge Theory, and
Categorification Seminar September 18, 2015
- Conference on “Geometry and topology of symplectic 4-manifolds”,
University of Massachusetts Amherst April 24–26, 2015
- Brandeis University, Topology seminar April 23, 2015
- AMS Spring Western Sectional Meeting, Special session on contact
geometry and low-dimensional topology, Las Vegas, NV April 18–19, 2015
- LA Topology Seminar (joint seminar for Caltech, UCLA, and USC), UCLA April 6, 2015
- AMS Spring Eastern Sectional Meeting, Special session on geometric
structures on low-dimensional manifolds and their invariants, Washington, DC March 7–8, 2015
- Stony Brook University, Topology seminar February 19, 2015
- Princeton University, Topology seminar February 12, 2015
- Rutgers University, Geometric analysis seminar February 3, 2015
- PATCH seminar (joint seminar for Bryn Mawr, Haverford, Penn, Temple) November 21, 2014
- University of Texas at Austin, Geometry seminar November 13, 2014
- University of Virginia, Geometry seminar October 7, 2014

- Chinese University of Hong Kong (6-hour minicourse plus 3 research talks) June 9–27, 2014
- AMS Spring Eastern Sectional Meeting, Special session on invariants in low-dimensional topology, Baltimore, MD March 29–30, 2014
- Institute for Advanced Study, Princeton U./IAS Symplectic Geometry Seminar March 5, 2014
- Harvard University, Gauge Theory and Topology Seminar January 31, 2014
- Duke University, Duke–UNC Topology Seminar December 3, 2013
- University at Buffalo, Geometry and Topology Seminar November 1, 2013
- Princeton University, Topology Seminar September 26, 2013
- Canadian Undergraduate Mathematics Conference, Montreal, plenary speaker July 13, 2013
- Simons Center for Geometry and Physics, Topology Seminar May 16, 2013
- University of Massachusetts Amherst, Geometry and Topology Seminar February 26, 2013
- Louisiana State University, Topology Seminar January 30, 2013
- AMS Fall Eastern Sectional Meeting, Special session on symplectic and contact topology, Rochester, NY September 23, 2012
- CAST Summer School and Conference, Rényi Institute of Mathematics, Budapest, Hungary July 9–20, 2012
- Gökova Geometry/Topology Conference, Gökova, Turkey May 28–June 2, 2012
- 2012 Georgia Topology Conference May 9–13, 2012
- Stony Brook University, Topology Seminar May 3, 2012
- Boston College, Geometry/Topology Seminar March 22, 2012
- Duke University, Geometry/Topology Seminar February 27, 2012
- Columbia University, Symplectic Geometry, Gauge Theory, and Categorification Seminar November 11, 2011
- Université de Montréal, Symplectic Topology Seminar October 10, 2011
- LA Topology Seminar (joint seminar for Caltech, UCLA, and USC), California Institute of Technology September 30, 2011
- UCLA, Topology Seminar September 28, 2011
- Harvard University, Gauge Theory and Topology Seminar September 23, 2011
- AMS Spring Southeastern Section Meeting, Special session on low dimensional topology and contact and symplectic geometry, Statesboro, GA March 12, 2011
- University of Massachusetts Amherst, Geometry and Topology Seminar March 1, 2011
- Harvard University, Gauge Theory and Topology Seminar February 18, 2011

CONFERENCES
ATTENDED

- Symplectic geometry - celebrating the work of Simon Donaldson, Newton Institute, Cambridge August 14–18, 2017
- Kylerec 2017: Symplectic fillings of contact manifolds, Truckee, CA May 19–25, 2017
- Engel structures, American Institute of Mathematics, San Jose, CA April 17–21, 2017
- Summer school on symplectic topology, sheaves and mirror symmetry, Institut de Mathématiques de Jussieu June 27–July 8, 2016
- Perspectives in topology and geometry of 4-manifolds, Dubrovnik, Croatia June 6–10, 2016
- Summer school on moduli problems in symplectic geometry, IHES July 6–17, 2015
- Texas Geometry and Topology Conference, University of Texas at Austin November 14–16, 2014

- Combinatorial link homology theories, braids, and contact geometry, ICERM, Providence, RI August 4–8, 2014
- SQuaRE research group on “Sheaf theory and Legendrian knots”, American Institute of Mathematics, Palo Alto, CA April 21–25, 2014
- Low-dimensional topology after Floer, Université de Montréal July 8–12, 2013
- Low dimensional topology, Simons Center for Geometry and Physics May 20–24, 2013
- Mapping class groups and categorification, Banff International Research Station April 7–12, 2013
- Contact and symplectic topology, Université de Nantes June 14–18, 2011
- Interactions between contact symplectic topology and gauge theory in dimensions 3 and 4, Banff International Research Station March 20–25, 2011
- Research workshop: Homology theories of knots and links, MSRI March 15–19, 2010
- Introductory workshop: Homology theories of knots and links, MSRI January 25–29, 2010
- Georgia International Topology Conference, University of Georgia May 18–29, 2009
- Contact structures, dynamics and the Seiberg-Witten equations in dimension 3, MSRI June 9–13, 2008
- Knot theory: Fifty years since Fox and Milnor, Brandeis University June 2–5, 2008

SERVICE

- Referee for Adv. Math., Ann. of Math., Ann. Henri Lebesgue, Compositio Math., Duke Math. J., Geom. Topol., IMRN, Invent. Math., J. Differential Geom., J. Eur. Math. Soc., J. Symplectic Geom., J. Topology, Mat. Proc. Cambridge Philos. Soc., Math. Res. Lett., Proc. Gökova Geom. Topol. Conf., Proc. Lond. Math. Soc., Quantum Topol., Quart. J. Math., Trans. Amer. Math. Soc.
- Reviewer for *Mathematical Reviews*
- Grant reviews for EPSRC (UK), NSERC (Canada)
- Wrote Sage program (approx. 2500 lines) for computations in Legendrian contact homology, available publicly at <http://www.imperial.ac.uk/~ssivek/code/lch.sage>
- Co-organizer, Princeton Low-Dimensional Topology Workshop 2015 June 15–19, 2015
- Advised one junior paper (Princeton) Spring 2015
- Mentor, Kylerec 2017 (graduate student workshop on symplectic fillings) May 19–25, 2017
- Supervised 11 MSc projects, 2 bachelor theses, and 1 UROP (Imperial) 2017–present
- External examiner for PhD thesis of Alexandru Cioba (UCL) January 2018
- External examiner for PhD thesis of Sungkyung Kang (Oxford) March 2019
- External examiner for PhD thesis of Fan Ye (Cambridge) May 2022