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Scientific Education	10/2005–07/2008	PhD in Mathematics (summa cum laude) TU Berlin (with G. Ziegler) Title: <i>Constructions and obstructions for extremal polytopes</i>
	10/1999–09/2005	Diploma in Computer Science (with distinction) TU Berlin (with G. Ziegler) Title: <i>On the combinatorics of projected deformed products</i>
Scientific/ Professional Vita	08/2017–12/2017	Research Professor, MSRI, Berkeley
	09/2016–	Professor (W2), Goethe-Universität Frankfurt
	07/2011–08/2016	Junior Professor (W1), Freie Universität Berlin
	01/2009–07/2011	Miller Research Fellow, UC Berkeley (with D. Eisenbud, B. Sturmfels)
	10/2008–12/2008	Postdoc, Konrad-Zuse-Zentrum Berlin (ZIB) (with M. Grötschel)
	2006–2008	Phase II Student, Berlin Mathematical School (DFG Graduate School)
	1998–2003	Freelance Software Engineer
Awards	2017	Research Professorship, MSRI-Program <i>Geometric and Topological Combinatorics</i>
	2016	Professorship (W3), University of Konstanz (declined)
	2010	Runner-Up for Richard-Rado-Prize (honorable mention)
	2009	Tiburtius Prize (Berlin dissertation prize)
	2008	Miller Research Fellowship
	2008	Certificate of Excellence of the Berlin Mathematical School
Research Activities	2012–	coPI, DFG Transregio Collaborative Research Unit (TR109) ‘Discretization in Geometry and Dynamics’ (DGD)
	2012–2016	Junior Faculty Member, DFG Research Training Group (GRK 1408) ‘Methods for Discrete Structures’ (MDS)
	2011–2016	Faculty Member, Berlin Mathematical School (BMS)
	2006–2012	Associate Member, DFG Research Unit 565 ‘Polyhedral Surfaces’
	2006–2008	Member, RTG ‘Methods for Discrete Structures’ (GRK 1408)
Organiz. Activities	2017	MSRI Summer School ‘Positivity questions in geometric combinatorics’
	2015	Summer school ‘Convex Geometry – discrete and computational’, Berlin
	2015	Workshop ‘Discrete Models in Geometry and Topology’, Berlin
	2013	Workshop ‘Delaunay Geometry: Polytopes, Triangulations and Spheres’, Berlin
	2013	Birthday conference for Günter M. Ziegler, Berlin
	2011–2016	Organizer ‘Oberseminar Diskrete Geometrie’, FU Berlin
	2011	Workshop ‘High-Complexity Discrete Geometry’, Berlin
	2011	Minisymposium ‘Algebraic Geometry in Convex Optimization’, SIAM Conference on Applied Algebraic Geometry, Raleigh, NC, USA

	2009–2011	Member of steering committee, 'Bay Area Discrete Math Day'
	2010	Main organizer, 21st Bay Area Discrete Math Day, MSRI, Berkeley, USA
	2009–2010	Organizer 'Discrete Math Seminar', UC Berkeley, USA
Editorships	2011	Guest Editor, Special Issue of <i>Annals of Combinatorics</i> for the 10th Anniversary of the Bay Area Discrete Math Day
Review duties (Selection)		American Mathematical Monthly, Advances in Geometry, Compositio Mathematica, Discrete & Computational Geometry, European Journal of Combinatorics, Geometriae Dedicata, Israel Journal of Mathematics, Journal of Algebraic Combinatorics, Journal of Combinatorial Theory Series A, Mathematische Zeitschrift, Michigan Mathematical Journal, SIAM Journal on Optimization, Proceedings of the AMS, Transactions of the AMS; Symposium on Computational Geometry (SoCG), Symposium on Discrete Algorithms (SODA); International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC)
Invited Lectures (Selection)	2019	Discrete geometry with a view on symplectic and tropical geometry, Cologne, Germany
	2019	Convex, Discrete and Integral Geometry, Jena, Germany
	2019	Convexity day, MPI Leipzig, Germany
	2019	Oberwolfach Workshop 'Geometric, algebraic, and topological combinatorics'
	2019	Summer School on Geometric and Algebraic Combinatorics, Paris, France
	2019	Colloquium talk, University of Fribourg, Switzerland
	2019	Minicourse, Simons Institute, Berkeley, USA
	2019	Algebra & Discrete Mathematics Seminar, UC Davis, USA
	2019	Combinatorics Seminar, UC Berkeley, USA University, USA
	2019	Seminar 'Algebra, Combinatorics, Geometry', San Francisco State University, USA
	2018	Colloquium talk, University Bielefeld, Germany
	2018	Discrete Optimization Seminar, EPFL, Lausanne, Switzerland
	2018	BMS Friday Lecture, Berlin Mathematical School, Berlin, Germany
	2018	Combinatorial Geometries: Matroids, Oriented Matroids and Applications, CIRM, France
	2018	26th National School on Algebra, Constanta, Romania
	2018	Colloquium talk, University Heidelberg, Germany
	2018	Colloquium talk, University Osnabrück, Germany
	2018	Combinatorics Seminar, Université Aix-Marseille, France
	2018	Workshop on Combinatorics, Polytopes, and Complexity, Mittag-Leffler Institute, Sweden
	2018	Combinatorics Seminar, KTH Stockholm, Sweden
	2017	Combinatorics Seminar, U Washington, Seattle
	2017	Mini-Workshop: Lattice Polytopes, Oberwolfach, Germany
	2017	79-te Seminario Lotharingien de Combinatoire, Bertinoro, Italy
	2017	MSRI-Workshop: Geometric and Topological Combinatorics
	2017	Colloquium talk, University Cologne, Germany
	2017	Workshop on Perspectives and Emerging Topics in Algebra and Konvexity (PEAK), Austria
	2016	Einstein Workshop on Lattice Polytopes, FU Berlin, Germany
	2016	Fall School, 'Discrete Geometry and Topology', TU Graz, Austria
	2016	Combinatorics Seminar, UC Berkeley, Berkeley, USA
	2015	SIAM Conference 'Applied Algebraic Geometry', Korea
	2015	RISC Summer School 'Algorithmic and Enumerative Combinatorics', Linz, Austria
	2015	Workshop on NonLinear Algebra, Berlin
	2015	ERC Workshop 'Discrete Models in Geometry and Topology', Berlin
	2015	Oberwolfach Workshop 'Discrete Differential Geometry'

2015 Dagstuhl Seminar ‘Limitations of convex programming’
 2015 Oberwolfach Workshop ‘Algebraic and topological combinatorics’
 2014 Algebra & Geometry Seminar, Aalto University, Finland
 2014 Oberseminar Geometrie, Universität zu Köln
 2014 Oberwolfach Workshop ‘Real Algebraic Geometry’
 2014 Oberseminar Diskrete Mathematik, Goethe Universität Frankfurt
 2014 BMS Days, Berlin Mathematical School, Berlin
 2014 Kolloquium der Mathematik, Universität Osnabrück
 2013 INdA Conference ‘Combinatorial Methods in Algebra and Topology’, Cortona, Italy
 2013 SIAM Conference ‘Applied Algebraic Geometry’, Fort Collins, Colorado, USA
 2013 Spring School ‘Geometric Combinatorics’, Hanoi, Vietnam
 2013 Mathematisches Kolloquium, Universität Rostock
 2012 Berlin-Poznań Seminar on Discrete Mathematics, ZIB, Berlin
 2012 Seminar ‘Algebra, Combinatorics, Geometry’, San Francisco State University, USA
 2012 National School ‘Invariants in Comm. Algebra and in Algebraic Geometry’, Mangalia, Romania
 2012 21st International Symposium on Mathematical Programming, Berlin
 2012 12th International Workshop on High Performance Optimization, Delft, Netherlands
 2012 Monday lecture, RTG ‘Methods for Discrete Structures’, Berlin
 2011 Minisymposium ‘Diskrete Geometrie und Diskrete Topologie’, DMV Annual Meeting, Cologne
 2010 Workshop ‘Convex Optimization and Algebraic Geometry’, IPAM, Los Angeles, USA
 2010 Symposium ‘Diskrete Mathematik’, Vienna, Austria
 2010 AMS Section Meeting ‘Special Session on Geometric Combinatorics’, Albuquerque, USA
 2009 Oberwolfach Seminar ‘New Trends in Algorithms for Real Algebraic Geometry’
 2009 19th Bay Area Discrete Math Day, California State University, East Bay, USA
 2007 Oberwolfach Workshop ‘Geometric and Topological Combinatorics’
 2007 MSRI Workshop ‘Topological Methods in Combinatorics, Computational Geometry, and the Study of Algorithms’, Berkeley, USA
 2006 Discrete and Computational Geometry – Twenty Years Later, Snowbird, USA

Advising	Postdocs	Arnaud Padrol (1/2013–9/2015, Project A3, DGD) Spencer Backman (5/2017–12/2017, Project A3, DGD)
	PhD	Katharina Jochemko (10/2011–12/2014, Hilda Geiringer Scholarship, BMS) Francesco Grande (10/2012–10/2015, PhD scholarship, MDS) Tobias Friedl (10/2013–05/2017) Sebastian Manecke (04/2017–)
	Master	12 completed, 2 current
	Bachelor	7 completed, 2 current
	Mentoring	7 BMS Phase-II students (PhD), 1 BMS Phase-I student 2 undergraduate students (Deutschlandstipendium, TANDEM) Mentor for <i>Schülerstudenten</i> (currently 6) at Goethe University

Publications Books

[1] M. Beck and R. Sanyal, *Combinatorial Reciprocity Theorems*, vol. 195 of Graduate Studies in Mathematics, American Mathematical Society, Providence, RI, 2018.

Refereed publications

[2] K. Adiprasito and R. Sanyal, *An Alexander-type duality for valuations*, Proc. Amer. Math. Soc., 143 (2015), pp. 833–843. doi:10.1090/S0002-9939-2014-12366-5.

- [3] ———, *Relative Stanley–Reisner theory and Upper Bound Theorems for Minkowski sums*, Publ. Math. Inst. Hautes Études Sci., 124 (2016), pp. 99–163. doi:10.1007/s10240-016-0083-7.
- [4] K. A. Adiprasito, P. Brinkmann, A. Padrol, P. Paták, Z. Patáková, and R. Sanyal, *Colorful simplicial depth, minkowski sums, and generalized gale transforms*, International Mathematics Research Notices, 6 (2019), pp. 1894–1919. doi:10.1093/imrn/rnx184.
- [5] A. Bhardwaj, P. Rostalski, and R. Sanyal, *Deciding polyhedrality of spectrahedra*, SIAM J. Optim., 25 (2015), pp. 1873–1884. doi:10.1137/120904172.
- [6] F. Breuer and R. Sanyal, *Ehrhart theory, modular flow reciprocity, and the Tutte polynomial*, Math. Z., 270 (2012), pp. 1–18. doi:10.1007/s00209-010-0782-6.
- [7] T. Chappell, T. Friedl, and R. Sanyal, *Two double poset polytopes*, SIAM J. Discrete Math., 31 (2017), pp. 2378–2413. doi:10.1137/16M1091800.
- [8] G. Codenotti, L. Katthän, and R. Sanyal, *On f - and h -vectors of relative simplicial complexes*, Algebraic Combinatorics, 2 (2019), pp. 343–353. e-journal.
- [9] A. Dochtermann, M. Joswig, and R. Sanyal, *Tropical types and associated cellular resolutions*, J. Algebra, 356 (2012), pp. 304–324. doi:10.1016/j.jalgebra.2011.12.028.
- [10] A. Dochtermann and R. Sanyal, *Laplacian ideals, arrangements, and resolutions*, J. Algebraic Combin., 40 (2014), pp. 805–822. doi:10.1007/s10801-014-0508-7.
- [11] F. Frick and R. Sanyal, *Minkowski complexes and convex threshold dimension*, J. Combin. Theory Ser. A, 151 (2017), pp. 202–206. doi:10.1016/j.jcta.2017.04.010.
- [12] T. Friedl, C. Riener, and R. Sanyal, *Reflection groups, reflection arrangements, and invariant real varieties*, Proc. Amer. Math. Soc., 146 (2018), pp. 1031–1045. doi:10.1090/proc/13821.
- [13] K. Fritsch, J. Heuer, R. Sanyal, and N. Schulz, *The Martin Gardner Polytopes*, American Mathematical Monthly. accepted for publication, arXiv:1808.08797.
- [14] L. Gellert and R. Sanyal, *On degree sequences of undirected, directed, and bidirected graphs*, European J. Combin., 64 (2017), pp. 113–124. doi:10.1016/j.ejc.2017.04.002.
- [15] F. Grande, A. Padrol, and R. Sanyal, *Extension complexity and realization spaces of hypersimplices*, Discrete Comput. Geom., 59 (2018), pp. 621–642. doi:10.1007/s00454-017-9925-4.
- [16] F. Grande and R. Sanyal, *Theta rank, levelness, and matroid minors*, J. Combin. Theory Ser. B, 123 (2017), pp. 1–31. doi:10.1016/j.jctb.2016.11.002.
- [17] C. Haase, M. Juhnke-Kubitzke, R. Sanyal, and T. Theobald, *Mixed Ehrhart polynomials*, Electron. J. Combin., 24 (2017), pp. Paper 1.10, 14. e-journal.
- [18] B. Hanke, R. Sanyal, C. Schultz, and G. M. Ziegler, *Combinatorial Stokes formulas via minimal resolutions*, J. Combin. Theory Ser. A, 116 (2009), pp. 404–420. doi:10.1016/j.jcta.2008.06.009.
- [19] K. Jochemko and R. Sanyal, *Arithmetic of marked order polytopes, monotone triangle reciprocity, and partial colorings*, SIAM J. Discrete Math., 28 (2014), pp. 1540–1558. doi:10.1137/130944849.
- [20] ———, *Combinatorial mixed valuations*, Adv. Math., 319 (2017), pp. 630–652. doi:10.1016/j.aim.2017.08.032.
- [21] ———, *Combinatorial positivity of translation-invariant valuations and a discrete Hadwiger theorem*, J. Eur. Math. Soc. (JEMS), 20 (2018), pp. 2181–2208. doi:10.4171/JEMS/809.
- [22] T. Netzer and R. Sanyal, *Smooth hyperbolicity cones are spectrahedral shadows*, Math. Program. Ser. B, 153 (2015), pp. 213–221. doi:10.1007/s10107-014-0744-6.
- [23] T. Rörig and R. Sanyal, *Non-projectability of polytope skeleta*, Adv. Math., 229 (2012), pp. 79–101. doi:10.1016/j.aim.2011.09.004.
- [24] R. Sanyal, *Topological obstructions for vertex numbers of Minkowski sums*, J. Combin. Theory Ser. A, 116 (2009), pp. 168–179. doi:10.1016/j.jcta.2008.05.009.
- [25] ———, *On the derivative cones of polyhedral cones*, Adv. Geom., 13 (2013), pp. 315–321. doi:10.1515/advgeom-2011-051.
- [26] R. Sanyal, F. Sottile, and B. Sturmfels, *Orbitopes*, Mathematika, 57 (2011), pp. 275–314. doi:10.1112/S002557931100132X.
- [27] R. Sanyal and C. Stump, *Lipschitz polytopes of posets and permutation statistics*, J. Combin. Theory Ser. A, 158 (2018), pp. 605–620. doi:10.1016/j.jcta.2018.04.006.
- [28] R. Sanyal, B. Sturmfels, and C. Vinzant, *The entropic discriminant*, Adv. Math., 244 (2013), pp. 678–707. doi:10.1016/j.aim.2013.05.019.
- [29] R. Sanyal, A. Werner, and G. M. Ziegler, *On Kalai’s conjectures concerning centrally symmetric poly-*

topes, Discrete Comput. Geom., 41 (2009), pp. 183–198. doi:10.1007/s00454-008-9104-8.

- [30] R. Sanyal and G. M. Ziegler, *Construction and analysis of projected deformed products*, Discrete Comput. Geom., 43 (2010), pp. 412–435. doi:10.1007/s00454-009-9146-6.

Preprints

- [31] K. Adiprasito and R. Sanyal, *Whitney numbers of arrangements via measure concentration of intrinsic volumes*. Preprint, June 2016, 9 pages, [arXiv:1606.09412](https://arxiv.org/abs/1606.09412).
- [32] S. Backman, S. Manecke, and R. Sanyal, *Cone valuations, Gram's relation, and flag-angles*. Preprint, September 2018, 17 pages, [arXiv:1809.00956](https://arxiv.org/abs/1809.00956).
- [33] F. Kohl, M. Olsen, and R. Sanyal, *Unconditional reflexive polytopes*. Preprint, June 2019, 18 pages, [arXiv:1906.01469](https://arxiv.org/abs/1906.01469).
- [34] S. Manecke, R. Sanyal, and J. So, *S-hypersimplices, pulling triangulations, and monotone paths*. Preprint, December 2018, 10 pages, [arXiv:1812.07491](https://arxiv.org/abs/1812.07491).