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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	09/2016–	Professor, Goethe-University Frankfurt
	07/2011–08/2016	Junior Professor (W1), FU 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)
	09/2006–10/2006	Research associate, Mathematical Science Research Institute, Berkeley Program ‘Computational Applications of Algebraic Topology’
	2006–2008	Phase II Student, Berlin Mathematical School (DFG Graduate School)
	1998–2003	Freelance Software Engineer
	10/1998–01/1999	Lecturer at advanced training facility for digital media
Awards	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, 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)		2016 Fall School, 'Discrete Geometry and Topology', TU Graz, Austria 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

Teaching	Winter 2015/16	Discrete Geometry III Seminar 'Continuous Combinatorics'
	Summer 2015	Discrete Geometry II Seminar 'Extensions of Polytopes'
	Winter 2014/15	Discrete Geometry I
	Summer 2014	Combinatorial Reciprocity Theorems Seminar 'Discrete Geometry – Beyond the Basics'
	Winter 2013/14	Discrete Geometry III Seminar 'Roundness' Seminar 'Lie groups and Lie algebras'
	Summer 2013	Discrete Geometry II Seminar 'Realizations of polytopes'
	Winter 2012/13	Discrete Geometry I
	Summer 2012	Seminar 'Submodular functions and convexity'
	Winter 2011/12	Combinatorial Reciprocity Theorems Seminar 'Polyedrische Geometrie – Finite Elemente'
Advising	Postdocs	Arnau Padrol (1/2013–9/2015, Project A3, DGD)
	PhD	Katharina Jochemko (10/2011–12/2014, Hilda Geiringer Scholarship, BMS) Title: <i>On the combinatorics of valuations</i> Francesco Grande (10/2012–10/2015, PhD scholarship, MDS) Title: <i>On <math>k</math>-level matroids: geometry and combinatorics</i> Tobias Friedl (10/2013–)
	Master	9 completed, 3 current
	Bachelor	5 completed
	Mentoring	7 BMS Phase-II students (PhD), 1 BMS Phase-I student 2 undergraduate students (Deutschlandstipendium, TANDEM)

Publications Refereed publications

- [1] 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.
- [2] ———, *Relative Stanley–Reisner theory and Upper Bound Theorems for Minkowski sums*, Publ. Math. Inst. Hautes Études Sci., (Online first, March 2016). 10.1007/s10240-016-0083-7.
- [3] A. Bhardwaj, P. Rostalski, and R. Sanyal, *Deciding polyhedrality of spectrahedra*, SIAM J. Optim., 25 (2015), pp. 1873–1884. doi:10.1137/120904172.
- [4] 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.
- [5] 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.
- [6] 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.
- [7] 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.
- [8] K. Jochemko and R. Sanyal, *Combinatorial positivity of translation-invariant valuations and a discrete hadwiger theorem*, J. Eur. Math. Soc. (JEMS), accepted for publication, arXiv:1505.07440.
- [9] ———, *Arithmetic of marked order polytopes, monotone triangle reciprocity, and partial colorings*, SIAM J. Discrete Math., 28 (2014), pp. 1540–1558. doi:10.1137/130944849.

- [10] T. Netzer and R. Sanyal, *Smooth hyperbolicity cones are spectrahedral shadows*, Math. Prog. B, special issue ‘Lifts of Convex Sets in Optimization’, in press (2014). doi:[10.1007/s10107-014-0744-6](https://doi.org/10.1007/s10107-014-0744-6).
- [11] 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](https://doi.org/10.1016/j.aim.2011.09.004).
- [12] 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](https://doi.org/10.1016/j.jcta.2008.05.009).
- [13] ———, *On the derivative cones of polyhedral cones*, Adv. Geom., 13 (2013), pp. 315–321. doi:[10.1515/advgeom-2011-051](https://doi.org/10.1515/advgeom-2011-051).
- [14] R. Sanyal, F. Sottile, and B. Sturmfels, *Orbitopes*, Mathematika, 57 (2011), pp. 275–314. doi:[10.1112/S002557931100132X](https://doi.org/10.1112/S002557931100132X).
- [15] 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](https://doi.org/10.1016/j.aim.2013.05.019).
- [16] R. Sanyal, A. Werner, and G. M. Ziegler, *On Kalai’s conjectures concerning centrally symmetric polytopes*, Discrete Comput. Geom., 41 (2009), pp. 183–198. doi:[10.1007/s00454-008-9104-8](https://doi.org/10.1007/s00454-008-9104-8).
- [17] 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](https://doi.org/10.1007/s00454-009-9146-6).

#### Preprints

- [18] K. Adiprasito, P. Brinkmann, A. Padrol, P. Paták, Z. Patáková, and R. Sanyal, *Colorful simplicial depth, Minkowski sums, and generalized Gale transforms*. Preprint, July 2016, 17 pages, [arXiv:1607.00347](https://arxiv.org/abs/1607.00347).
- [19] 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).
- [20] T. Chappell, T. Friedl, and R. Sanyal, *Two double poset polytopes*. Preprint, June 2016, 35 pages, [arXiv:1606.04938](https://arxiv.org/abs/1606.04938).
- [21] F. Frick and R. Sanyal, *Minkowski complexes and convex threshold dimension*. Preprint, July 2016, 4 pages, [arXiv:1607.07814](https://arxiv.org/abs/1607.07814).
- [22] T. Friedl, C. Riener, and R. Sanyal, *Reflection groups, arrangements, and invariant real varieties*. Preprint, February 2016, 15 pages, [arXiv:1602.06732](https://arxiv.org/abs/1602.06732).
- [23] L. Gellert and R. Sanyal, *On degree sequences of undirected, directed, and bidirected graphs*. Preprint, December 2015, 13 pages, [arXiv:1512.08448](https://arxiv.org/abs/1512.08448).
- [24] F. Grande, A. Padrol, and R. Sanyal, *Extension complexity and realization spaces of hypersimplices*. Preprint, January 2016, 18 pages, [arXiv:1601.02416](https://arxiv.org/abs/1601.02416).
- [25] F. Grande and R. Sanyal, *Theta rank, levelness, and matroid minors*. Preprint, August 2014, 18 pages, [arXiv:1408.1262](https://arxiv.org/abs/1408.1262). accepted to *J. Combin. Theory Ser. B* pending revisions.
- [26] C. Haase, M. Juhnke-Kubitzke, R. Sanyal, and T. Theobald, *Mixed ehrhart polynomials*. Preprint, September 2015, 11 pages, [arXiv:1509.02254](https://arxiv.org/abs/1509.02254). accepted to *Electron. J. Combin.* pending revisions.
- [27] K. Jochemko and R. Sanyal, *Combinatorial mixed valuations*. Preprint, May 2016, 16 pages, [arXiv:1605.07431](https://arxiv.org/abs/1605.07431).

#### Others

- [28] M. Beck and R. Sanyal, *Combinatorial Reciprocity Theorems*. Book in preparation. Preliminary version available at <http://math.sfsu.edu/beck/crt.html>.
- [29] R. Sanyal, *Discrete Geometry II: Discrete convex geometry*, 2013. lecture notes for graduate class, 83 pages, <http://page.mi.fu-berlin.de/sanyal/teaching/dg2>.
- [30] ———, *Discrete Geometry III: Polytope algebras and the  $g$ -Theorem*, 2014. lecture notes for graduate class, 110 pages, <http://page.mi.fu-berlin.de/sanyal/teaching/dg3>.