

Timo de Wolff

Curriculum Vitae

Technische Universität Braunschweig
Institut für Analysis und Algebra
AG Algebra
Universitätsplatz 2
38106 Braunschweig, Germany
✉ t.de-wolff@tu-braunschweig.de
🌐 <http://www.iaa.tu-bs.de/timodewolff/>

Employment and Education

- Since April 2019 **W2 Professor (Associate Professor with tenure)**, *Department of Mathematics, Technical University Braunschweig, Braunschweig, Germany.*
- July 2017 – April 2019 **Head of Emmy Noether Junior Research Group**, *Department of Mathematics, Technical University Berlin, Berlin, Germany.*
- Aug 2014– May 2017 **Visiting Assistant Professor**, *Department of Mathematics, Texas A&M University, College Station, TX, USA.*
Mentors: Frank Sottile, Maurice Rojas
- July 2013– Aug 2014 **Postdoc**, *Department of Mathematics, Saarland University, Saarbrücken, Germany.*
Mentor: Hannah Markwig
- 2009–2013 **PhD in Mathematics**, *Goethe University, Frankfurt/Main, Germany.*
Advisor: Thorsten Theobald; Total grade: Summa cum laude (with highest honors)
- 2004–2009 **Diplom (Master) in Mathematics**, *Goethe University, Frankfurt/Main, Germany.*
Advisor: Thorsten Theobald; Total grade: Mit Auszeichnung (with distinction)
- 2002–2011 **Magister Artium (Master) in Philosophy**, *Goethe University, Frankfurt/Main, Germany.*
Advisor: Wilhelm K. Essler; Total grade: Mit Auszeichnung (with distinction)

Grants, Awards, Scholarships, and Long Term Visits

Grants (Single PI)

- 2017–2023 **DFG Emmy Noether Junior Research Group**, *Project title: “New Certificates of Nonnegativity and Their Application in Science and Engineering”, €770.800 (~ \$ 901.200; overhead not included).*
Single PI
- 2015–2017 **AMS-Simons travel grant**, \$ 4000.
Single PI

Grants (Die Junge Akademie)

- since 2019 **Die Junge Akademie**, *Funding for in total eight projects joint with various PI's (fellow members of the academy) so far., In summary ~€145.000.*
Further details on request.

Grants (Co-PI)

- 2018–2019 **DFG Excellence Strategy**, *Project title: "Berlin Mathematics Research Center "MATH+ ""*, Several million Euro funding volume.
Co-PI; in summary 25 PI's and 10 Co-PI's; joint proposal of the math institutes of TU Berlin, FU Berlin, Humboldt University, as well as WIAS and the Zuse Institute.
Note: The program runs until 2024; I left in April '19 due to my move to TU Braunschweig.
- 2018–2021 **Programme Gaspard Monge pour l'Optimisation**, *Project title: "Optimisation hyperbolique: algorithmes et implantations"*, €8000.
Co-PI; PI: S. Naldi; further Co-PI's: M. Kummer, D. Plaumann, R. Sinn.

Grants (Supported as Host)

- 2021–2023 **Host and mentor for DFG Walter Benjamin Fellow Boulos El Hilany**, *Project title: "Classifying polynomial maps by means of polyhedral geometry"*, €153.600 (overhead not included).

Conference Travel Grants

- 2016 **XXI Coloquio Latinoamericano de Álgebra NSF travel grant**, \$ 1600.
2016 **FPSAC '16 conference travel grant**, \$ 750.
2015 **SIAM Conference on Applied Alg. Geom. 2015 NSF travel grant**, \$ 1350.
2015 **MEGA 2015 conference travel grant**, ~ \$ 550.

Awards

- 2019–2024 **Elected member of Die Junge Akademie (German National Young Academy)**, at the Berlin-Brandenburgische Akademie der Wissenschaften (BBAW) and the Nationale Akademie der Wissenschaften Leopoldina.
- 2014 **Prize of the association of supporters of the Goethe University for young scientists 2014**.
Preis der Vereinigung von Freunden und Förderern der Goethe Universität für den naturwissenschaftlichen Nachwuchs 2014. Three prizes granted in total.
- 2009 **Minor prize of the DMV-Studierendenkonferenz 2009**.
for the Diploma thesis "*Polytope mit speziellen Simplizes*".
- 2009 **Honors for the best graduation**.
master level in mathematics at the Goethe University in the winter term 08/09.

Scholarships

- Oct. 2007 – **Scholarship of the "German National Academic Foundation"**.
Dec. 2009 Scholarship of the "*Stiftung des deutschen Volkes*".

Memberships

- Since Sep. 2017 **Associated Member of the SFB-TRR 195 "Symbolic Tools in Mathematics and their Application"**.
- Since July 2017 **Emmy Noether Programme of the DFG**.
- Since 2017 / 2019 **Member of SIAM and Deutsche Mathematiker Vereinigung (DMV)**.

June 2018 – **Junior Faculty Member in the Graduiertenkolleg [GRK 2434](#) “Facets of Complexity”**.
April 2019

Oct. 2017 – **Postdoctoral Faculty Member of the [Berlin Mathematical School](#)**.
April 2019

July 2017 – **Member of the [MATHEON Research Center](#)**.
April 2019

Long Term Visits

Jan 22–Mar. **Institut Mittag-Leffler, Djursholm, Sweden**.
17; Apr. Semester program “Tropical geometry, amoebas and polytopes”
16–20, 2018

Publications

Research Articles

- Nondegenerate Multistationarity in Small Reaction Networks**
with A. Shiu; *Discrete and Continuous Dynamical Systems, Series B*, **24** (6) (June 2019), 2683-2700.
- An Approach to Constrained Polynomial Optimization via Nonnegative Circuit Polynomials and Geometric Programming**
with M. Dressler, and S. Ilman; *Journal of Symbolic Computation* (special issue for “MEGA 2017”), **91**, (2019), 149-172.
- Imaginary Projections of Polynomials**
with T. Jörgens, and T. Theobald; *Journal of Symbolic Computation* (special issue for “MEGA 2017”), **91**, (2019), 181-199.
Was accepted for a talk at “MEGA 2017”.
- Lopsided Approximation of Amoebas**
with J. Forsgård, L. Matusevich, and N. Mehlhop; *Mathematics of Computation*, **88** (315) (2019), 485-500.
- A Positivstellensatz for Sums of Nonnegative Circuit Polynomials**
with M. Dressler, and S. Ilman; *SIAM Journal on Applied Algebra and Geometry*, **1** (1) (2017), 536-555.
Was accepted for a talk at “MEGA 2017”.
- Lower Bounds for Polynomials with Simplex Newton Polytopes Based on Geometric Programming**
with S. Ilman; *SIAM Journal on Optimization*, **26** (2) (2016), 1128-1146.
- Amoebas, Nonnegative Polynomials and Sums of Squares Supported on Circuits**
with S. Ilman; *Research in the Mathematical Sciences*, **3** (1) (2016), 1-35.
Was accepted for a talk at “MEGA 2015”.
- Norms of Roots of Trinomials**
with T. Theobald; *Mathematische Annalen*, **366** (1) (2016), 219-247.
Was accepted for a talk at “MEGA 2015”.
- Separating Inequalities for Nonnegative Polynomials that Are not Sums of Squares**
with S. Ilman; *Journal of Symbolic Computation*, **68** (2015), part 2, 181-194 (special issue for “MEGA 2013”).
Was accepted for a talk at “MEGA 2013”.
- Approximating Amoebas and Coamoebas by Sums of Squares**

with T. Theobald; *Mathematics of Computation* **84** (2015), 455-473.

Was accepted for a poster presentation at "MEGA 2011".

11. **Amoebas of Genus at Most One**

with T. Theobald; *Advances in Mathematics* **239** (2013), 190-213.

Conference Articles

Covers only articles accepted for talks at peer reviewed conferences, which appeared in the conference proceedings, and which have not additionally been published in a journal (yet).

12. **Global Optimization via the Dual SONC Cone and Linear Programming**

with M. Dressler, H. Naumann, and J. Heuer; *Proceedings of ISSAC 2020*, Kalamata, Greece, July 20-23, 2020 (virtual conference due to COVID-19) (I. Z. Emiris, and L. Zhi (eds.)), ACM, (2020), 138 - 145.

13. **Computing the Real Isolated Points of an Algebraic Hypersurface**

with P. L. Huu, and M. Safey El Din; *Proceedings of ISSAC 2020*, Kalamata, Greece, July 20-23, 2020 (virtual conference due to COVID-19) (I. Z. Emiris, and L. Zhi (eds.)), ACM, (2020), 297-304.

14. **New Dependencies of Hierarchies in Polynomial Optimization**

with A. Kurpisz; *Proceedings of ISSAC 2019*, Beijing, China, July 15-18, 2019 (J. H. Davenport, D. Wang, M. Kauers, and R. J. Bradford (eds.)), ACM, (2019), 251-258.

15. **Exact Optimization via Sums of Nonnegative Circuits and Sums of AM/GM Exponentials**

with V. Magron and H. Seidler; *Proceedings of ISSAC 2019*, Beijing, China, July 15-18, 2019 (J. H. Davenport, D. Wang, M. Kauers, and R. J. Bradford (eds.)), ACM, (2019), 291-298.

16. **A New Method for Computing Elimination Ideals of Likelihood Equations**

with X. Tang and R. Zhao; *Proceedings of ISSAC 2019*, Beijing, China, July 15-18, 2019 (J. H. Davenport, D. Wang, M. Kauers, and R. J. Bradford (eds.)), ACM, (2019), 339-346.

Articles Accepted for Publication

Covers articles accepted for publication in a journal or in conference proceedings after a peer-review.

17. **Initial Steps in the Classification of Maximal Mediated Sets**

with J. Hartzler, O. Röhrig, and O. Yürük; to appear in the *Journal of Symbolic Computation* (special issue for "MEGA 2019"); published electronically on July 08, 2020; doi: 10.1016/j.jsc.2020.07.013; see also [ArXiv 1910.00502](https://arxiv.org/abs/1910.00502).

Was accepted for a poster presentation at "MEGA 2019".

18. **The Kinetic Space of Multistationarity in Dual Phosphorylation**

with E. Feliu, N. Kaihnsa, and O. Yürük; to appear in the *Journal of Dynamics and Differential Equations*; published electronically on Sep. 04, 2020; doi: 10.1007/s10884-020-09889-6; see also [ArXiv 2001.08285](https://arxiv.org/abs/2001.08285).

19. **Evaluation of Pool-based Testing Approaches to Enable Population-wide Screening for COVID-19**

with D. Pflüger, M. Rehme, J. Heuer, and M.-I. Bittner; to appear in *PLOS ONE*; see the accompanying website at <https://ipvs.informatik.uni-stuttgart.de/sgs/cgi-bin/JA/covid19/> and the code and data at <https://github.com/SC-SGS/covid19-pooling>; see also [ArXiv 2004.11851](https://arxiv.org/abs/2004.11851).

20. **Optimization over the Boolean Hypercube via Sums of Nonnegative Circuit Polynomials**

with M. Dressler and A. Kurpisz; to appear in *Foundations of Computational Mathematics*; extended abstract was published in proceedings of *43rd International Symposium on Mathematical Foundations of Computer Science, MFCS 2018*, Liverpool, UK, August 27-31, 2018, (I. Potapov, P. G. Spirakis, and J. Worrell, eds.), LIPIcs, **117**, Schloss Dagstuhl - Leibniz-Zentrum fuer

Informatik, (2018), 82:1-82:17. Was also accepted for a talk at “[FLoC 2018](#)”.

Preprints

Covers also articles accepted for talks or posters at peer reviewed conferences, which did not appear in the conference proceedings or journals yet.

21. **A Polyhedral Homotopy Algorithm For Real Zeros**
with A. A. Ergür; see [ArXiv 1910.01957](#).
22. **The Algebraic Boundary of the SONC Cone**
with J. Forsgård; see [ArXiv 1905.04776](#).
23. **An Experimental Comparison of SONC and SOS Certificates for Unconstrained Optimization**
with H. Seidler; see [ArXiv 1808.08431](#).
Was accepted for a talk at “[MEGA 2019](#)”.
24. **The Lattice of Amoebas**
with J. Forsgård; see [ArXiv 1711.02705](#).
25. **Intersections of Amoebas**
with M. Juhnke-Kubitzke; see [ArXiv 1510.08416](#)
Was accepted for a poster presentation at “[FPSAC '16](#)”.
26. **A Sharp Upper Bound for the Complexity of Labeled Oriented Trees**
with M. Christmann; see [ArXiv 1412.7257](#)
27. **The Boundary of Amoebas**
with F. Schroeter; see [ArXiv 1310.7363](#)
28. **Low Dimensional Test Sets for Nonnegativity of Even Symmetric Forms**
with S. Ilman; see [ArXiv 1303.4241](#)
29. **Polytopes with Special Simplices;**
see [ArXiv 1009.6158](#)

Conference Proceedings

1. **Mathematical Software - ICMS 2020, Proceedings**
with A.M. Bigatti, J. Carette, J.H. Davenport, and M. Joswig (Eds.), LNCS 12097, Springer 2020.

Surveys

1. **Amoebas and their Tropicalizations – a Survey**
“*Analysis meets Geometry: The Mikael Passare Memorial Volume*”, M. Andersson, J. Boman, C. Kiselman, P. Kurasov, R. Sigurdsson (Eds.), Series: [Trends in Mathematics](#), Birkäuser Mathematics, 2017, 157-190.
2. **Amoebas, Nonnegative Polynomials and Sums of Squares Supported on Circuits**
an extended abstract for the correspondent article; [Oberwolfach Report](#), no. 23, 2015, 1308-1311;
for the workshop “*Tropical Aspects in Geometry, Topology and Physics*”.

Outreach Writings

1. **#StopPandemicBias: scientists, share your privilege**
with U. Endesfelder, D. Pflüger; [Nature](#) 583, 683 (2020); doi: 10.1038/d41586-020-02234-3.

Theses

1. **On the Geometry, Topology and Approximation of Amoebas**
PhD-thesis (Dissertation) for mathematics, 2013.
2. **Goodmans “New Riddle of Induction” - Eine Analyse auf mathematischer Grundlage**

Master thesis (Magisterarbeit) for philosophy (in German), 2010.

3. **Polytope mit speziellen Simplizes**

Master thesis (Diplomarbeit) for mathematics (in German), 2008.

Software Projects (Selection)

1. **POEM**, a **Python** based software for polynomial optimization using SONC and SOS nonnegativity certificates;
with H. Seidler.
Latest Version: (0.2.1.0(a)); (prototype – for test purposes only). Latest Update: 07/04/19.
Development: July 2017–present.
2. **Maximal_Mediated_Sets.sage**, a **Python** class for the computation of maximal mediated sets via **SAGE**;
with J. Hartzer.
Latest Version: (0.1.0.1(a)). Latest Update: 04/03/17. Development: Fall 2016–Spring 2017.
3. **VIRO.sage**, a **Python** class for using Viro’s Patchworking from within **SAGE**;
with C. O’Neill and E. Owusu Kwaakwah (alumna).
Latest Version: (0.4b). Latest Update: 05/09/18. Development: Spring 2015–present.

Talks

Peer Reviewed Conference Talks

- June 18, 2019 **MEGA 2019**, *Universidad Complutense de Madrid, Spain*.
An Experimental Comparison of SONC and SOS Certificates for Unconstrained Optimization
- July 5, 2016 **FPSAC '16**, *Simon Fraser University, Vancouver, Canada*.
Intersections of Amoebas (poster presentation)
- June 18, 2015 **MEGA 2015**, *University of Trento, Italy*.
Norms of Roots of Trinomials
- June 15, 2015 **MEGA 2015**, *University of Trento, Italy*.
Amoebas, Nonnegative Polynomials and Sums of Squares Supported on Circuits
- June 5, 2013 **MEGA 2013**, *Goethe University, Frankfurt/Main, Germany*.
Separating Inequalities for Nonnegative Polynomials that Are not Sums of Squares
- May 31, 2011 **MEGA 2011**, *Stockholm University, Sweden*.
Approximation of Amoebas and Coamoebas by Sums of Squares (poster presentation)

Invited Conference Talks

- Aug 16-20, 2021 **Minisymposium “Computational Real Algebraic Geometry” at the 2021 SIAM Conference on Applied Algebraic Geometry**, *Texas A&M University, TX, USA*.
Applications of SONCs and other Certificates of Nonnegativity in Chemical Reaction Networks
- March 13-14, 2021 **AMS special session on “Optimization and Real Algebraic Geometry” at the Spring Southeastern Sectional Meeting 2021 (online)**, *Georgia Tech, Atlanta, GA, USA*.
Certificates of Nonnegativity and Their Applications in Theoretical Computer Science
- Sep 14-17, 2020 **Minisymposium “Computeralgebra” at the DMV Jahrestagung (online)**, *TU Chemnitz, Germany*.
Note: **Minisymposium cancelled due to COVID-19**
- June 15-24, 2020 **Workshop “Computational Algebraic Geometry” at the FoCM 2020 Conference**, *Simon Fraser University, Vancouver, Canada*.
Note: **Conference cancelled due to COVID-19**

- Oct 8, 2019 **“Varieties, Polyhedra, Computation” - Opening Conference for the MATH+ Semester on Applied Algebraic Geometry, TU Berlin, Germany.**
Discriminants, Nonnegativity, and Tropical Geometry
- Sep 27, 2019 **Workshop “Discrete Geometry with a View on Symplectic and Tropical Geometry”, Univ. zu Köln, Germany.**
Discriminants, Nonnegativity, and Tropical Geometry
- Aug 6, 2019 **Conic, Copositive and Polynomial Optimization Cluster, ICCOPT 2019, Berlin, Germany.**
New Dependencies of Hierarchies in Polynomial Optimization
- July 11, 2019 **Minisymposium “Numerical Methods for Structured Polynomial Solving” at the 2019 SIAM Conference on Applied Algebraic Geometry, Bern, Switzerland.**
Polyhedral Real Homotopy Continuation
- March 20, 2019 **Conference “Mathematics of Quantum Information”, Siegen, Germany.**
New Dependencies of Hierarchies in Polynomial Optimization
- Dec. 14, 2018 **Workshop on Applied Algebraic Geometry, Bristol, UK.**
Nondegenerate Multistationarity in Small Reaction Networks
- Nov. 21, 2018 **Session on “Semialgebraic Optimization and Applications” at the PGM Days 2018, EDF’Lab Paris-Saclay, France.**
An Experimental Comparison of SONC and SOS Certificates for Unconstrained Optimization
- Nov. 3, 2018 **AMS special session on “Numerical Methods for Nonlinear Systems”, University of Arkansas, Fayetteville, AR, USA.**
Polynomial Optimization via SONC Certificates
- Oct. 19, 2018 **Workshop on Real Algebraic Geometry and Optimization, ICERM, Brown University, RI, USA.**
An Experimental Comparison of SONC and SOS Certificates for Unconstrained Optimization
- Oct. 2, 2018 **Workshop on “Hot Topics: Shape and Structure of Materials”, MSRI, Berkeley, CA, USA.**
An Introduction to Computational Algebraic Geometry and Polynomial Optimization
- July 12, 2018 **Session on “Theory of Convex Optimization” at the 2018 SIAM Annual Meeting, Portland, OR.**
Optimization over the Boolean Hypercube via Sums of Nonnegative Circuit Polynomials
- July 3, 2018 **Workshop on “Relative Entropy Programming” at the ISMP 2018, Bordeaux, France.**
Optimization over the Hypercube via Sums of Nonnegative Circuit Polynomials
- Feb 22, 2018 **Workshop on “Combinatorics, Polytopes, and Complexity” during the Semester Program “Tropical Geometry, Amoebas, and Polytopes”, Institut Mittag-Leffler, Djursholm, Sweden.**
The Lattice of Amoebas
- Nov. 14, 2017 **Session on “Hierarchies of Certified Convex Programs for Polynomial Systems” at the PGM Days 2017, EDF’Lab Paris-Saclay, France.**
Note: **Cancelled due to sickness**
- Aug. 4, 2017 **Minisymposium “Semidefinite Optimization and Convex Algebraic Geometry” at the 2017 SIAM Conference on Applied Algebraic Geometry, Atlanta, GA.**
The Relation between SOS and SONC
- July 11, 2017 **Workshop “Computational Algebraic Geometry” at FoCM 2017, Barcelona, Spain.**
A Positivstellensatz for Sums of Nonnegative Circuit Polynomials
- May 22-25, 2017 **Minisymposium “Relative Entropy Relaxations for Signomial Optimization” at the 2017 SIAM Conference on Optimization, Vancouver, Canada.**
Note: **Cancelled due to move to Germany**

- Nov. 30, 2016 **Workshop “Algorithms and Effectivity in Tropical Mathematics and Beyond”**, *Schloss Dagstuhl, Germany*.
Lopsided Amoeba Approximation
- Nov. 14, 2016 **Session “Mixed Integer Polynomial Optimization” at the 2016 INFORMS Annual Meeting**, *Nashville, TN*.
New Certificates for Nonnegativity via Nonnegative Circuit Polynomials
- Nov. 12, 2016 **AMS special session on “Applied Algebraic Geometry”**, *North Carolina State University, Raleigh, NC*.
New Certificates for Nonnegativity via Nonnegative Circuit Polynomials
- May 4, 2016 **Eighth Discrete Geom. and Algebr. Combinatorics Conf.**, *South Padre Island, TX*.
New Certificates for Nonnegativity via Circuit Polynomials and Geometric Programming
- April 9, 2016 **Meeting on Algebraic Geometry for Applications**, *Clemson University, SC*.
New Certificates for Nonnegativity via Circuit Polynomials and Geometric Programming
- Aug. 4, 2015 **Minisymposium “Tropical Geometry” at the SIAM Conference on Applied Algebraic Geometry**, *NIMS & KAIST, Deajeon, South Korea*.
Roots of Trinomials from the Viewpoint of Amoeba Theory
- May 29, 2015 **Workshop on NonLinear Algebra**, *Academy of Sciences and Humanity, Berlin, Germany*.
Computing Amoebas
- May 1, 2015 **Tropical Aspects in Geometry, Topology and Physics**, *MFO, Oberwolfach, Germany*.
Amoebas, Nonnegative Polynomials and Sums of Squares Supported on Circuits
- June 27, 2014 **Tropical Dibbelabbes**, *Saarland University, Saarbrücken, Germany*.
Amoebas, Nonnegative Polynomials and Sums of Squares Supported on Circuits
- Sep. 3, 2013 **Tropical Geometry and Topology**, *MPI, Bonn, Germany*.
Roots of Trinomials from the Viewpoint of Amoeba Theory
- July 30, 2011 **4th PhD-students Conference on Tropical Geometry**, *Technische Universität Kaiserslautern, Germany*.
The Configuration Space of Amoebas with Barycentric Simplex Newton Polytope
- Oct. 2, 2009 **DMV-Studierendenkonferenz**, *Ruhr Universität, Bochum, Germany*.
Polytopes with Special Simplices
- Dec. 11, 2009 **1st PhD-students Conference on Tropical Geometry**, *Technische Universität Berlin, Germany*.
Amoebas of Genus at Most One
- [Further Conference Talks](#)
- Oct 11, 2019 **Herbstplenum der Jungen Akademie**, *Katholische Akademie Hamburg, Germany*.
Artificial Intelligence in Medicine (poster presentation; joint with I. N. Schellinger)
- Oct 11, 2019 **Herbstplenum der Jungen Akademie**, *Katholische Akademie Hamburg, Germany*.
Identifying Parameter Regions of Monostationarity via SONC (poster presentation)
- Sep. 27, 2017 **First annual meeting of the DFG collaborative research center SFB-TRR 195**, *RWTH Aachen, Germany*.
Lopsided Amoeba Approximation
- Aug. 2, 2017 **Minisymposium “Real Algebraic Geometry and Optimization” at the SIAM Conference on Applied Algebraic Geometry**, *Atlanta, GA*.
Current Key Problems on Sums of Nonnegative Circuit Polynomials
- June 10, 2017 **Workshop “Polynomials and Polytopes”**, *Technische Universität Berlin, Germany*.
A New Approach to Nonnegativity and Polynomial Optimization
- July 26, 2016 **XXI Coloquio Latinoamericano de Álgebra**, *Universidad de Buenos Aires, Argentina*.
Intersections of Amoebas (poster presentation)

- April 2, 2016 **TAGS 2016**, *University of Texas at Austin, TX.*
Intersections of Amoebas (poster presentation)
- Jan. 9, 2016 **Joint Mathematics Meeting**, *Seattle, WA.*
Nonnegative Polynomials and Sums of Squares Supported on Circuits
- Nov. 7, 2015 **TGTC '15**, *Rice University, Houston, TX.*
Norms of Roots of Trinomials (poster presentation)
- Apr. 11, 2015 **TAGS 2015**, *Texas A&M University, College Station, TX.*
Norms of Roots of Trinomials (poster presentation)
- March 15, 2014 **Annual conference of the DFG priority project SPP 1489 “Algorithmic and experimental methods in algebra, geometry, and number theory”**, *Bad Boll, Germany.*
Amoebas, Nonnegative Polynomials and Sums of Squares Supported on Circuits
- Sep. 25, 2013 **ÖMG-DMV Congress 2013**, *University of Innsbruck, Austria.*
Roots of Trinomials from the Viewpoint of Amoeba Theory
- Sep. 18, 2012 **DMV-Jahrestagung**, *Saarland University, Saarbrücken, Germany.*
Tropical Approaches to Amoebas Supported on a Circuit
- April 2, 2012 **Workshop “Tropical Geometry”**, *ICMS, Edinburgh, Scotland.*
The Configuration Space of Amoebas (poster presentation)
- Nov. 12, 2010 **Kolkom 2010**, *MPI, Saarbrücken, Germany.*
Polytopes with Special Simplices

Research Seminar Talks

- March 09, 2021 **SIAM SAGA - Seminar on Applied Geometry and Algebra (online)**, *Recurring monthly virtual seminar by the SIAM algebraic geometry activity group.*
TBA
- Jan 21, 2021 **Oberseminar Algebraische Geometrie**, *LUH Hannover, Germany.*
Nonnegativity, Discriminants, and Tropical Geometry
- Sep 8, 2020 **Nonlinear Algebra Seminar Online (NASO)**, *MPI Leipzig (online).*
New Dependencies of Hierarchies in Polynomial Optimization
- June 11, 2020 **Seminar on Combinatorial Aspects of Commutative Algebra and Algebraic Geometry (CACAAG)**, *IITB, Bombay, India (online).*
Nonnegativity, Discriminants, and Tropical Geometry
- Jan. 09, 2019 **Discrete Mathematics and Geometry Seminar**, *Technische Universität Berlin, Germany.*
Nondegenerate Multistationarity in Small Reaction Networks
- Oct. 29, 2018 **Industrial & Applied Mathematics Seminar**, *Texas A&M University, College Station, TX, USA.*
An Experimental Comparison of SONC and SOS Certificates for Unconstrained Optimization
- Oct. 26, 2018 **Valley Geometry Seminar**, *UMass Amherst, MA, USA.*
An Experimental Comparison of SONC and SOS Certificates for Unconstrained Optimization
- May 14, 2018 **Séminaire Parisien d’Optimisation**, *Institut Henri Poincaré, Paris, France.*
A New Approach to Nonnegativity and Polynomial Optimization
- Nov. 29, 2017 **Graduiertenkolleg: “Kombinatorische Strukturen in der Geometrie”**, *Universität Os-nabrück, Germany.*
Discrete Structures Related to Nonnegativity
- Nov. 20, 2017 **Graduiertenkolleg: “Methods for Discrete Structures”**, *Technische Universität Berlin, Germany.*
Discrete Structures Related to Nonnegativity

- Oct. 27, 2017 **Oberseminar “Mathematische Optimierung”**, *Otto von Guericke Universität Magdeburg, Germany.*
A New Approach to Nonnegativity and Polynomial Optimization
- Aug. 23, 2017 **Discrete Mathematics and Geometry Seminar**, *Technische Universität Berlin, Germany.*
Intersections of Amoebas
- July 14, 2017 **Applied Mathematics Seminar**, *Hausdorff Center for Mathematics, Bonn, Germany.*
A New Approach to Nonnegativity and Polynomial Optimization
- Feb 17, 2017 **Geometry Seminar**, *Texas A&M University, College Station, TX.*
Constrained Polynomial Optimization via SONCs and Relative Entropy Programming
- Feb 17, 2017 **Algebra and Combinatorics Seminar**, *Texas A&M University, College Station, TX.*
A Positivstellensatz for Sums of Nonnegative Circuit Polynomials
- Feb 7, 2017 **Junior Algebra & Geometry Seminar**, *Texas A&M University, College Station, TX.*
An Introduction to Tropical Geometry
- Nov. 25, 2016 **Discrete Geometry Seminar**, *Freie Universität Berlin, Germany.*
A New Approach to Nonnegativity and Polynomial Optimization
- Nov. 24, 2016 **Discrete and Algorithmic Geometry Seminar**, *Technische Universität Berlin, Germany.*
A New Approach to Nonnegativity and Polynomial Optimization
- April 8, 2016 **Algebraic Geometry and Number Theory Seminar**, *Clemson University, SC.*
Intersections of Amoebas
- March 16, 2016 **Algebra Seminar**, *Universidad de Los Andes, Bogotá, Colombia.*
An Introduction to Amoeba Theory and Intersections of Amoebas
- Feb 16, 2016 **Junior Algebra & Geometry Seminar**, *Texas A&M University, College Station, TX.*
An Introduction to Tropical Geometry
- Feb. 11, 2016 **Scientific and Statistical Computing Seminar**, *University of Chicago, IL.*
New Certificates for Nonnegativity via Circuit Polynomials and Geometric Programming
- Feb. 4, 2016 **FRAGMENT Seminar**, *Colorado State University, Fort Collins, CO.*
An Introduction to Amoeba Theory and Intersections of Amoebas
- Feb. 3, 2016 **Joint FRAGMENT and Poisson Geometry Seminar**, *Univ. of Colorado at Boulder, CO.*
New Certificates for Nonnegativity via Circuit Polynomials and Geometric Programming
- Jan. 29, 2016 **Algebra and Combinatorics Seminar**, *Texas A&M University, College Station, TX.*
Intersections of Amoebas
- Oct. 6, 2015 **Algebra seminar**, *Emory University, Atlanta, GA.*
Roots of Trinomials from the Viewpoint of Amoeba Theory
- Oct. 5, 2015 **Algebra seminar**, *Georgia Tech, Atlanta, GA.*
Amoebas, Nonnegative Polynomials and Sums of Squares Supported on Circuits
- Sep. 15, 2015 **Algebraic Geometry and Number Theory Seminar**, *Rice University, Houston, TX.*
Nonnegative Polynomials and Sums of Squares Supported on Circuits
- June 26, 2015 **CAKE Seminar**, *Universität Osnabrück, Germany.*
An Introduction to Amoeba Theory
- June 11, 2015 **Oberseminar Algebraische Geometrie**, *Universität Augsburg, Germany.*
Roots of Trinomials from the Viewpoint of Amoeba Theory
- March 6, 2015 **Algebra and Combinatorics Seminar**, *Texas A&M University, College Station, TX.*
A Sharp Upper Bound for the Complexity of Labeled Oriented Trees
- Feb. 19, 2015 **Number Theory Seminar**, *University of Texas at Austin, TX.*
Nonnegative Polynomials and Sums of Squares Supported on Circuits

- Feb. 16, 2015 **Geometry Seminar**, *Texas A&M University, College Station, TX.*
The Boundary of Amoebas
- Sep. 30, 2014 **Student Working Sem. in Discrete Math.**, *Texas A&M University, College Station, TX.*
An Introduction to Amoeba Theory
- Sep. 29, 2014 **Geometry Seminar**, *Texas A&M University, College Station, TX.*
Amoebas, Nonnegative Polynomials and Sums of Squares Supported on Circuits
- Sep. 23, 2014 **Student Working Sem. in Discrete Math.**, *Texas A&M University, College Station, TX.*
An Introduction to Tropical Geometry
- June 5, 2014 **Discrete Geometry Seminar**, *Freie Universität Berlin, Germany.*
Nonnegative Polynomials and Sums of Squares Supported on Circuits
- Jan. 28, 2014 **Research Group “Polyhedral Surfaces”**, *Technische Universität Berlin, Germany.*
An Introduction to Amoeba Theory
- Jan. 27, 2014 **AG Diskrete Mathematik**, *Goethe University, Frankfurt/Main, Germany.*
The Boundary of Amoebas
- Jan. 15, 2014 **Oberseminar: Optimierung, Geometrie und diskrete Math.**, *Universität zu Köln, Germany.*
Amoebas, Nonnegative Polynomials and Sums of Squares Supported on Circuits
- Dec. 5, 2013 **Oberseminar Algebraische Geometrie und Computeralgebra**, *Saarland University, Saarbrücken, Germany.*
The Boundary of Amoebas
- July 12, 2013 **AG Diskrete Mathematik**, *Goethe University, Frankfurt/Main, Germany.*
Contemporary Key Problems in Amoeba Theory
- Oct. 28, 2012 **PhD-students seminar**, *Goethe University, Frankfurt/Main, Germany.*
An Introduction to Amoeba Theory
- June 27, 2012 **AG & Oberseminar Diskrete Mathematik**, *Goethe University, Frankfurt/Main, Germany.*
Roots of Trinomials from the Viewpoint of Amoeba Theory
- June 8, 2012 **Working group algebra and combinatorics**, *CWI, Amsterdam, The Netherlands.*
Separating Inequalities for Nonnegative Polynomials that Are not Sums of Squares
- June 6, 2012 **Séminaire de Géométrie Tropicale**, *Université Pierre et Marie Curie (Paris 6), Paris, France.*
Roots of Trinomials from the Viewpoint of Amoeba Theory
- May 23, 2012 **Oberseminar “Kombinatorik und Algebra”**, *Philipps-Universität, Marburg.*
Roots of Trinomials from the Viewpoint of Amoeba Theory
- Feb. 1, 2012 **Research Seminar**, *Université de Genève, Switzerland.*
Contemporary Key Problems in Amoeba Theory
- July 5, 2011 **AG & Oberseminar Diskrete Mathematik**, *Goethe University, Frankfurt/Main, Germany.*
The Configuration Space of Amoebas with Barycentric Simplex Newton Polytope
- Nov. 27, 2010 **Research Seminar**, *Courant Research Centre, Göttingen, Germany.*
(Co)Amoebas: Different Aspects of Approximation, Boundary and Homotopy
- Dec. 18, 2009 **AG & Oberseminar Diskrete Mathematik**, *Goethe University, Frankfurt/Main, Germany.*
Amoebas of Genus at Most One
- Colloquium and Job Talks**
- Nov 6, 2020 **Colloquium**, *Universität des Saarlandes, Germany.*
A New Approach to Nonnegativity and its Applications
- May 22, 2019 **Colloquium**, *Universität Osnabrück, Germany.*
An Introduction to Nonnegativity and Polynomial Optimization

- June 26, 2018 **Colloquium**, *TU Kaiserslautern, Germany*.
Ein neuer Ansatz zu Nichtnegativität und polynomieller Optimierung
- May 24, 2018 **Colloquium**, *Universität Siegen, Germany*.
A New Approach to Nonnegativity and Polynomial Optimization
- May 3, 2018 **Colloquium**, *Otto von Guericke Universität Magdeburg, Germany*.
A New Approach to Nonnegativity and Polynomial Optimization
- March 27, 2018 **Colloquium**, *TU Braunschweig, Germany*.
A New Approach to Nonnegativity and Polynomial Optimization
- Jan. 17, 2018 **Colloquium**, *Universität Trier, Germany*.
A New Approach to Nonnegativity and Polynomial Optimization
- June 12, 2017 **Colloquium**, *Universität Leipzig, Germany*.
A New Approach to Nonnegativity and Polynomial Optimization
- Dec. 14, 2016 **Colloquium**, *University of Massachusetts at Amherst, Amherst, MA*.
A New Approach to Nonnegativity and Polynomial Optimization
- Oct. 5, 2016 **Colloquium**, *Sam Houston State University, Huntsville, TX*.
An Introduction to Amoeba Theory
- Oct. 19, 2015 **Postdoc Colloquium**, *Texas A&M University, College Station, TX*.
Nonnegative Polynomials and Sums of Squares Supported on Circuits
- Oct. 9, 2014 **Postdoc Colloquium**, *Texas A&M University, College Station, TX*.
Roots of Trinomials from the Viewpoint of Amoeba Theory

Outreach Talks

- Feb. 19, 2018 **BMS-Days**, *Urania, Berlin, Germany*.
An Introduction to Nonnegativity and Polynomial Optimization
- May 7, 2016 **Math Circle**, *Texas A&M University, College Station, TX*.
Public Key Cryptography
- Aug. 8, 2014 **Uni Camp 2014**, *Saarland University, Saarbrücken, Germany*.
Public Key Kryptoverfahren
- Aug. 8, 2014 **Uni Camp 2014**, *Saarland University, Saarbrücken, Germany*.
Mathematik Studieren
- Oct. 8, 2009 **Introduction week**, *Goethe University, Frankfurt/Main, Germany*.
Das Art Gallery Problem

Further Conferences and Workshops (selected)

- Nov. 27 – Dec. 2, 2016 **Seminar on Algorithms and Effectivity in Tropical Mathematics and Beyond**, *Schloss Dagstuhl, Germany*.
- Nov. 12–16, 2013 **GeoLMI 2013**, *CIRM, Marseille-Luminy, France*.
- May 31 – June 4, 2010 **Algebraic Optimization and Semidefinite Programming**, *MFO, Oberwolfach, Germany*.
- May 14–15, 2010 **Symposium “Diskrete Mathematik”**, *Erwin Schrödinger Institute, Vienna, Austria*.
- Nov. 22–28, 2009 **New Trends in Algorithms for Real Algebraic Geometry**, *CWI, Amsterdam, The Netherlands*, EIDMA Minicourse.
- Aug. 24–28, 2009 **Introductory Workshop: Tropical Geometry**, *MSRI, Berkeley, CA*.

Teaching

TU Braunschweig

- Spring 21 **Nonnegativity and Polynomial Optimization**, *Lecture; 4 hours per week.*
- Spring 21 **Algebra für Informatiker (Algebra for Computer Scientists)**, *Lecture; 2 hours per week.*
- Fall 20 **Bachelor Seminar on Algebra**, *Seminar; 2 hours per week; block course.*
2 bachelor level students
- Fall 20 **Diskrete Mathematik für Informatiker (Discrete Math for Computer Scientists)**,
Lecture; 2 hours per week.
roughly 230 students, mostly in first year
- Fall 20 **Fortgeschrittenenpraktikum Data Science (Advanced Practical Course on Data Science)**,
Laboratory (coding); 6 hours per week.
joint with C. Brauer and M. Neumann-Brosig; 17 master level students
- Fall 20 **Maschinelles Lernen mit neuronalen Netzen (Machine Learning with Neural Networks)**,
Lecture; 2 hours per week.
joint with C. Brauer; 75 master level students
- Fall 20 **Topologie (Topology)**, *Lecture; 4 hours per week; 11 bachelor level students.*
joint with K. Kozhasov
- Spring 20 **Master Seminar on Algebra**, *Seminar; 2 hours per week.*
joint with B. Eick; 4 master level students
- Spring 20 **Mathematische Algorithmen (Mathematical Algorithms)**, *Laboratory (coding and student talks); 2 hours per week.*
joint with J. Heuer and O. Yürük; 4 bachelor level students
- Spring 20 **Algebra**, *Lecture; 4 hours per week.*
roughly 25 bachelor level students
- Fall 19 **Computeralgebra (Computer Algebra)**, *Lecture; 4 hours per week.*
3 master level students
- Fall 19 **Diskrete Mathematik (Discrete Mathematics)**, *Lecture; 2 hours per week.*
roughly 20 bachelor level students
- Fall 19 **Kryptographie (Cryptography)**, *Lecture; 2 hours per week.*
roughly 15 master level students
- Spring 19 **Nonnegativity and Polynomial Optimization**, *Lecture; 4 hours per week.*
5 master level students

TU Berlin

- Fall 18 **Interior Point Methods**, *Reading Seminar.*
joint with A. Ergür

Texas A&M University, College Station

- Spring 17 **Math 304 – Linear Algebra**, *Lecture, Section 504.*
45 mostly second year students
- Fall 16 **2 × Math 304 – Linear Algebra**, *Lecture, Sections 505 and 506.*
39 and 45 mostly second year students
- Spring 16 **Math 302 – Discrete Mathematics**, *Lecture, Section 501.*
30 mostly second year students
- Fall 15 **Discriminants, Resultants, and Multidim. Determinants**, *Reading Seminar.*
joint with L. Matusevich

- Fall 15 **2 × Math 151 – Engineering Math I**, *Lecture*, Sections 501 - 503 and 528 - 530.
99 and 100 first year students
- Spring 15 **2 × Math 151 – Engineering Math I**, *Lecture*, Sections 516 - 521.
96 and 100 first year students
- Fall 14 **Math 302 – Discrete Mathematics**, *Lecture*, Section 501.
11 mostly second year students
- [Saarland University, Saarbrücken](#)
- Summer 14 **Toric Geometry**, *Reading Seminar*.
joint with C. Jürgens
- Winter 13/14 **Tutorial for the lecture “Linear Algebra I”**.
lecturer: H. Markwig
- [Goethe University, Frankfurt am Main \(as graduate student\)](#)
- Winter 12/13 **Optimization**, *Seminar*.
Department of Mathematics; joint with T. Theobald and C. Trabant
- Summer 11 **Geometry and Combinatorics of Spectrahedra**, *Seminar*.
Department of Mathematics; joint with T. Theobald
- Summer 10 **TA for the lecture “Tropical geometry”**.
Department of Mathematics; lecturer: T. Theobald
- Winter 09/10 **Fundamental Problems of Induction and Probability**, *Seminar*.
Department of Philosophy, joint with W.K. Essler
- Winter 09/10 **TA for the lecture “Symbolic computation and Gröbner bases”**.
Department of Mathematics; lecturer: T. Theobald
- Summer 09 **TA for the lecture “Lattices and cryptography”**.
Department of Mathematics; lecturer: C.-P. Schnorr
- [Goethe University, Frankfurt am Main \(as undergraduate student\)](#)

Provided on request.

Organized Conferences and Workshops

- October 17–22, 2021 **Real polynomials: Counting and stability**, *workshop*, organizer.
joint with F. Bihan, A. Dickenstein, T. Theobald; Oaxaca, Mexico
- Aug 16–20, 2021 **Polynomial Optimization and Applications**, *minisymposium at the 2021 “SIAM Conference on Applied Algebraic Geometry”*, organizer.
joint with M. Dressler; College Station, TX, USA; to be confirmed by the head organizers
- July 29–30, 2021 **Workshop on Real Algebraic and Convex Geometry**, *workshop*, organizer.
joint with B. El Hilany and K. Kozhasov; TU Braunschweig, Germany
- June 7–11, 2021 **MEGA 2021**, *conference*, member of the [executive committee](#).
The Arctic University, Tromsø, Norway
- Spring or Fall 2021 **Applied Algebra in Data Science**, *workshop*, organizer.
joint with T. Römer and F. Röttger; MPI Leipzig, Germany ([postponed from 2020](#) due to COVID-19)
- November 27, 2020 and April 16/17, 2021 **Music & Mathematics**, *Interdisciplinary symposium*, organizer.
joint with M. Akkermann and D. Pflüger; virtual / TU Dresden, Germany ([postponed](#) due to COVID-19).

- July 20–23, **ISSAC 2020**, *conference*, member of the poster committee.
2020 Kalamata, Messinia, Greece (occurred online due to COVID-19)
- July 13–17, **ICMS 2020**, *conference*, **local head organizer** and member of the program
2020 committee.
TU Braunschweig, Germany (occured online due to COVID-19)
- July 3–7, **Sparsity in Polynomial Sytems and Applications**, *minisymposium at the 2019*
2019 “SIAM Conference on Applied Algebraic Geometry”, organizer.
joint with M. Dressler; Bern, Switzerland.
- July 3–7, **Polynomial Optimization and its Applications**, *minisymposium at the 2019*
2019 “SIAM Conference on Applied Algebraic Geometry”, organizer.
joint with J. Gouveia and S. Naldi; Bern, Switzerland.
- June 7–8, **Applied Algebra**, *workshop*, organizer.
2019 joint with B. Sturmfels; TU Braunschweig, Germany.
- Dec. 17–18, **Berlin-Leipzig Seminar on Algebra, Geometry and Combinatorics**, *workshop*;
2017 *3rd meeting of this series in Fall '17*, organizer.
joint with M. Kummer; TU Berlin, Germany
- Aug. 1–2, **Real Algebraic Geometry and Optimization**, *minisymposium at the 2017 “SIAM*
2017 *Conference on Applied Algebraic Geometry”*, organizer.
joint with T. Theobald; Atlanta, GA
- June 10, 2017 **Polynomials and Polytopes**, *workshop*, organizer.
joint with B. Sturmfels; TU Berlin, Germany
- Aug. 3–7, **Real Algebraic Geometry and Optimization**, *minisymposium at the 2015 “SIAM*
2015 *Conference on Applied Algebraic Geometry”*, organizer.
joint with T. Theobald and C. Riener; NIMS, Daejeon, South Korea
- June 3–7, **MEGA 2013**, *conference*, coorganizer in the local committee.
2013 Goethe University, Frankfurt/Main, Germany
- March 7, **Math across the Main**, *workshop for PhD students and postdocs*, organizer.
2013 joint with S. Horn; Technische Universität Darmstadt, Germany
- May 5–7, **Discrete, Tropical and Algebraic Geometry**, *conference*, coorganizer.
2011 Goethe University, Frankfurt/Main, Germany
- June 16–17, **2nd PhD Students Conference on Tropical Geometry**, *conference*, organizer.
2010 joint with M. Häbich and T. Wagner; Goethe University, Frankfurt/Main, Germany

Professional Activities

Editorial Work

Covers only editorial work for journals that does not result in a published conference proceedings, which is listed under “Publications”.

- Jan. 2019 – **Associate Editor for the SIAM Journal on Applied Algebra and Geometry**
Jan. 2022 **(SIAGA)**.

Refereeing

Including reviews in progress.

Full Reviews for Research Journals:

1. [Advances in Applied Clifford Algebras](#),
2. [Advances in Geometry](#) (2 reviews),
3. [Advances in Mathematics](#),
4. [Arkiv for Matematik](#),
5. [Beiträge zur Algebra und Geometrie](#),
6. [Canadian Mathematical Bulletin](#),
7. [Experimental Mathematics](#),
8. [Foundations of Computational Mathematics](#) (2 reviews),
9. [International Mathematics Research Notices](#) (2 reviews),
10. [Linear Algebra and its Applications](#),
11. [Mathematical Proceedings](#),
12. [Journal of Algebra](#),
13. [Proceedings of the Royal Society A](#) (general science journal).

Collections, Conferences, and Conference Proceedings:

1. [ISSAC 2020](#), (poster session; reviews on 7 poster submissions),
2. [ICMS 2020](#), (conference proceedings; reports on 1 article and 5 software contributions),
3. [Combinatorial Algebraic Geometry Thematic Program](#), (book; report on 1 article),
4. [Mathematics: Frontiers and Perspectives](#) (conference proceedings).

Quick opinions (without full review):

1. [Mathematische Zeitschrift](#),
2. [SIAM Journal on Applied Algebra and Geometry \(SIAGA\)](#). (3 opinions)
3. [SIAM Journal on Matrix Analysis and Applications \(SIMAX\)](#).

Book reviews:

1. [Advances in two-dimensional Homotopy and Combinatorial Group Theory](#) (report on 1 chapter).

Grant applications:

1. [One review for a European national science foundation](#) (details on request).

Mentoring

Since Spring **DHV Welcome Program**.

2020 Mentoring program by the DHV for refugees studying at German universities; mentoring of one student from Syria starting in February 2020

Nov. 30, **BMS Career Talks 2018**.

2018 Panelist.

Spring 2018 – **BMS Mentor at TU Berlin**.

Spring 2019 One PhD student mentored Spring 2018 - Spring 2019; early mentor for two PhD students in Fall 2018.

Spring 2017 **Mentor at Texas A&M “Academy for Future Faculty”**.

One master student mentored

Spring 2017 **Junior Algebra & Geometry Seminar**, *Seminar for graduate students*.

joint with T. Brysiewicz

Fall 2016 **Student Working seminar in Algebra & Geometry**, *Seminar for graduate students*.

joint with T. Brysiewicz, K. Kordek, and O. Sobieska

Spring 2016 **Junior Algebra & Geometry Seminar**, *Seminar for graduate students*.

joint with T. Brysiewicz

Nov. 2014 - **Texas A&M Mathematical Coding Club**, organizer.

May 2016 joint with C. O'Neill

Outreach Activities

- Aug. 13, 2020 **In the Pursuit of Mathematics (Matematğin Peşinde)**, *Youtube Channel*.
Public discussion with the host O. Yürük about “Interdisciplinary Researchers and Where to Find Them”.
- June 17, 2020 **Junge Akademie@**, *Virtual Format*.
Public discussion with the architect B. Esche about “Ästhetik und Abstraktion” (“Aesthetics and Abstraction”).
- Jan. 18, 2020 **Salon-Sophie-Charlotte**.
Interdisciplinary exhibition “Zwischenwelten” as one part of the Salon; organized by the Class 2019 of Die Junge Akademie.
- Aug. 8, 2014 **Uni Camp 2014**, *a university summer school for highschool girls*, organizer of the math section.
Saarland University, Saarbücken

Hiring and Election Committees

- Fall 2020 till Spring 2021 **Auswahlkommission (election committee) for the Class of 2021 of Die Junge Akademie**, member.
Die Junge Akademie
- Since Spring 2020 **Hiring Committee for W2 Professorship “Mathematische Methoden der Datenanalyse” (“Mathematical Methods in Data Analysis”)**, external member.
Univ. Osnabrück
- Spring 2020 **Hiring Committee for MPI W2 Research Group Leader**, external member.
MPI Leipzig
- 2002–2013 **Professoral Hiring Committees**, *member*, two times as undergraduate representative and one time as graduate students and postdocs representative.
Goethe University

Local Seminar Organization

- Since Spring 2019 **Applied Algebra and Analysis Seminar**, organizer.
TU Braunschweig; jointly organized with D. Lorenz and K. Kozhasov; since Spring 2020 online together with Univ. Osnabrück, jointly organized with D. Lorenz, K. Kozhasov, S. Kunis, and T. Römer
- Aug. 2015 – May 2017 **Geometry Seminar**, administrative organizer.
Texas A&M University
- Feb. 2009 – June 2013 **AG & Oberseminar Diskrete Mathematik**, administrative organizer.
Goethe University

Departmental Service and Local Committees

- Fall 2019 **Math Department Strategy Committee**, member.
TU Braunschweig

Successful Former and Current Students

Postdocs

- Starting May 2021 **Boulos El Hilany**.
TU Braunschweig; Walter Benjamin Fellow

Since April 2019 **Khazhgali Kozhasov**,
TU Braunschweig

PhD Students

Since April 2019 **Janin Heuer**, *Extensions of SONC certificates (working title)*.
TU Braunschweig

Since Oct. 2017 **Oğuzhan Yürük**, *On the Maximal Mediated Set Structure and the Applications of Nonnegative Circuit Polynomials*.
TU Braunschweig; thesis submitted in Dec. 2020.

Master Students

since Jan. 2021 **Marie Rümmler**, *The Topology of Amoebas Supported on Circuits (working title)*.
TU Braunschweig

Jan. 2020 – Jan. 2021 **Lorenza Buogo**, *Lasserres Hierarchie für oberen Schranken für Nichtnegativitätsprobleme (Lasserre's Hierarchy for Upper Bounds for Nonnegativity Problems)*.
TU Braunschweig

Spring 2019 – Summer 2020 **Olivia Röhrig**, *Initial Steps In The Classification Of Maximal Mediated Sets*, see the corresponding article at [ArXiv 1910.00502](https://arxiv.org/abs/1910.00502).
supervised jointly with M. Joswig; Joint work started at TU Berlin, then supervised remotely from TU Braunschweig.

Aug. 2017 – March 2018 **Sascha Timme**, *Fast Computation of Amoebas, Coamoebas, and Imaginary Projections in Low Dimensions*, "[Dies Mathematicus](#)" award for the best master thesis in mathematics at TU Berlin in 2018 (tied with two other students).
TU Berlin

Bachelor Students

Since Oct. 2020 **Matthis Heimberg**, *Dey's and Kumar's NN-CRUST Algorithm for Curve Reconstruction (working title)*, Bachelor thesis.
TU Braunschweig

Since Sep. 2020 **Lisa Mertinaschk**, *Fortune's SweepLine Algorithm for Voronoi Diagrams (working title)*, Bachelor thesis.
TU Braunschweig

Since June 2020 **Marius Koch**, *Grover's Quantum Algorithm (working title)*, Bachelor thesis.
TU Braunschweig; supervised jointly with S. Stiller

Nov. 2017 – Oct. 2018 **Helena Müller**, *Minima of Polynomials via SONC Decompositions*, Bachelor thesis.
TU Berlin

2011 **Florian Landsgesell**, *Der Goemans-Williamson-Algorithmus für MAX CUT (The Goemans-Williamson Algorithm for MAX CUT)*, Bachelor thesis, co-advisor.
Goethe University; principal advisor: T. Theobald

Undergraduate Research Students

Jan. – May 2017 **Gerar Nawab**, *reading project about numerical methods for pricing exotic options*.
Texas A&M University

Jan. – May 2017 **Ryan Bailey**, *project about braid group representations over finite fields*.
Texas A&M University; supervised jointly with J. Plavnik

- Sep. 2016 – **Jacob Hartzler**, *project about maximal mediated sets*, see
 Jan. 2018 [Maximal_Mediated_Sets.sage](#) and eventually [ArXiv 1910.00502](#).
 Texas A&M University; informal supervision from TU Berlin since July 2017.
- Sep. 2015 – **Nathan Mehlhop**, *project about cyclic resultants*, see [ArXiv 1608.08663](#).
 Aug. 2016 Texas A&M University; supervised jointly with L. Matusevich
- Sep. 2015 – **Haley Lambright**, *project about nonnegative matrix factorization and geometric programming*.
 May 2016 Texas A&M University

PhD Students – Reviews and Committees

- 2021 **António Goucha**, *Non-Standard Ranks of Matrices*, defense committee member.
 Universidade de Coimbra, Portugal; principal advisor: J. Gouveia
- 2019 **Nidhi Kaihnsa**, *Algebraic Methods for Dynamical Systems and Optimisation*, second reviewer and defense committee member.
 MPI Leipzig and Universität Leipzig, Germany; principal advisor: B. Sturmfels

Master Students – Second Reviewer

- 2020 **Benjamin Kocurov**, *Rekonstruierbarkeit von dünnbesetzten Lösungen von linearen Gleichungssystemen (Reconstructability of Sparse Solutions of Systems of Linear Equations)*, second reviewer.
 TU Braunschweig; principal advisor: D. Lorenz
- 2018 **Marco Buhlheller**, *On the tropical central path*, second reviewer.
 TU Berlin; principal advisor: M. Joswig

Informal Thesis Co-Advisor

- Aug. 2017 – **Mathias Oster**, *Three Dimensional Auxetic Materials: Geometry, Deformation & Numerics*, Master thesis, informal co-advisor.
 June 2018 TU Berlin; principal advisors: M. Evans and J. Sullivan
- 2013 **Sandra Kiefer**, *Layered Realizations of Polytopes*, Master thesis, informal co-advisor.
 Goethe University; principal advisor: T. Theobald
- 2013 **Jan Hofmann**, *Comparison of the Effective Nullstellensätze and Applications*, Diploma thesis, informal co-advisor.
 Goethe University; principal advisor: T. Theobald
- 2011 **Sadik Iliman**, *Reihenbasierte Berechnung des Gerüsts von Amöben (Computation of the Spine of Amoebas Based on Power Series Representations)*, Master thesis, informal co-advisor.
 Goethe University; principal advisor: T. Theobald