

Timo de Wolff

Curriculum Vitae

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Employment and Education

- Since July 2017 **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 (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

- 2017–2021 **DFG Emmy Noether Junior Research Group**, €805.000 (~ \$ 899.466) guaranteed plus ~ €94.000 (~ \$ 105.030) tentative (if evaluated positively after 3 years).
Single PI
- 2015–2017 **AMS-Simons travel grant**, \$ 4000.
Single PI

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

- 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
- 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 “*Studienstiftung des deutschen Volkes*”.

Long Term Visits

Jan 15–Mar. **Institut Mittag-Leffler, Djursholm, Sweden.**

18, 2018 Semester program “Tropical geometry, amoebas and polytopes”

Publications

Research Articles

1. **Lopsided Approximation of Amoebas**
with J. Forsgård, L. Matusevich, and N. Mehlhop; to appear in *Mathematics of Computation*.
2. **A Positivstellensatz for Sums of Nonnegative Circuit Polynomials**
with M. Dressler, and S. Ilman; to appear in the *SIAM Journal on Applied Algebra and Geometry*.
Was accepted for a talk at “MEGA 2017”.
3. **Lower Bounds for Polynomials with Simplex Newton Polytopes Based on Geometric Programming**
with S. Ilman; *SIAM Journal on Optimization*, **26** (2) (2016), 1128-1146.
4. **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”.
5. **Norms of Roots of Trinomials**
with T. Theobald; *Mathematische Annalen*, **366** (1) (2016), 219-247.
Was accepted for a talk at “MEGA 2015”.
6. **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”.
7. **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”.
8. **Amoebas of Genus at Most One**
with T. Theobald; *Advances in Mathematics* **239** (2013), 190-213.

Preprints

9. **An Approach to Constrained Polynomial Optimization via Nonnegative Circuit Polynomials and Geometric Programming**
with M. Dressler, and S. Ilman; see [ArXiv 1602.06180](#)
10. **Imaginary Projections of Polynomials**
with T. Jörgens, and T. Theobald; see [ArXiv 1602.02008](#)
Was accepted for a talk at “MEGA 2017”.
11. **Intersections of Amoebas**
with M. Juhnke-Kubitzke; see [ArXiv 1510.08416](#)
Was accepted for a poster presentation at “FPSAC '16”.

12. **A Sharp Upper Bound for the Complexity of Labeled Oriented Trees**
with M. Christmann; see [ArXiv 1412.7257](#)
13. **The Boundary of Amoebas**
with F. Schroeter; see [ArXiv 1310.7363](#)
14. **Low Dimensional Test Sets for Nonnegativity of Even Symmetric Forms**
with S. Ilman; see [ArXiv 1303.4241](#)
15. **Polytopes with Special Simplices;**
see [ArXiv 1009.6158](#)

Surveys

1. **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*”.
2. **Amoebas and their Tropicalizations – a Survey**
to appear in “*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.

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

1. [Maximal_Mediated_Sets.sage](#), a [Python](#) class for the computation of maximal mediated sets from within [SAGE](#);
with J. Hartzer.
Latest Version: (0.1.0.1(a)). Latest Update: 04/03/17. Development: Fall 2016–present.
2. [Lopsided_Amoeba_Approximation.lib](#), a [SINGULAR/SAGE](#) software package for the approximation of amoebas via lopsided amoebas and cyclic resultants.
Latest Version: (0.1.0.0(a)). Latest Update: 08/30/16. Development: Spring 2016–present.
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: (0.3a). Latest Update: 05/31/16. Development: Spring 2015–present.

In Preparation for Submission (Articles)

1. **Amoebas of Exponential Sums** (working title)
with J. Forsgård
2. **A Note on Sums of Nonnegative Circuit Polynomials that are not Sums of Squares** (working title)
with S. Ilman
3. **Multiple Positive Solutions for Polynomial Systems Arising from Chemical Reaction Networks** (working title)
with A. Shiu.

In Preparation for Submission (Software)

1. [AMOEBALIB](#) (working title), a [SINGULAR](#) library for the computation of amoebas and related objects;

Talks

Peer Reviewed Conference Talks

- 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

- Dec. 12-14, 2017 **Workshop on Applied Algebraic Geometry**, *Bristol, UK.*
TBA
- Aug. 4, 2017 **Minisymposium “Semidefinite Optimization and Convex Algebraic Geometry” at the 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 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 **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](#)
- 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](#)
- Nov. 20, 2017 **Graduiertenkolleg: “Methods for Discrete Structures”**, *Technische Universität Berlin, Germany*.
TBA

- Aug. 23, 2017 **Discrete Mathematics and Geometry Seminar**, *Technische Universität Berlin, Germany.*
Intersections of Amoebas
- July 14, 2017 **Applied Mathematics Seminar**, *Universität 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 Talks

- 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. 19–20, 2018 **BMS-Days**, *Technische Universität Berlin, Germany.*
TBA

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

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 (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 (as undergraduate student)

- Summer 08 **Selected Topics of the Philosophy of Mathematics**, *Seminar*.
Department of Philosophy; joint with W.K. Essler and C. Riener
- Summer 07 **Mathematics for Philosophers**, *Seminar*.
Department of Philosophy
- Summer 07 **TA for the lecture “Discrete mathematics”**.
Department of Mathematics; lecturer: T. Theobald
- Winter 06/07 **TA for the lecture “Logic I”**.
Department of Philosophy; lecturer: A. Fuhrmann
- Summer 06 **TA for the lecture “Logic II”**.
Department of Philosophy; lecturer: W.K. Essler
- Winter 05/06 **TA for the lecture “Logic I”**.
Department of Philosophy; lecturer: W.K. Essler
- Winter 04/05 **TA for the lecture “Logic I”**.
Department of Philosophy; lecturer: W.K. Essler

Organized Conferences and Workshops

- Dec. 17/18, **Berlin-Leipzig Seminar on Algebra, Geometry and Combinatorics**, *workshop*;
2017 *3rd meeting in Fall '17*, organizer.
joint with M. Kummer; TU Berlin, Germany
- Aug. 1/2, **Real Algebraic Geometry and Optimization**, *minisymposium at the “SIAM Conference on Applied Algebraic Geometry”*, organizer.
2017 joint with T. Theobald; Atlanta, GA
- June 10, **Polynomials and Polytopes**, *workshop*, organizer.
2017 joint with B. Sturmfels; TU Berlin, Germany

- Aug. 3–7, **Real Algebraic Geometry and Optimization**, *minisymposium at the “SIAM Conference on Applied Algebraic Geometry”*, organizer.
2015 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

Refereeing

1. *Advances in Geometry*,
2. *Advances in Mathematics*,
3. *Advances in two-dimensional Homotopy and Combinatorial Group Theory* (book; report on 1 chapter),
4. *Arkiv for Matematik*,
5. *Canadian Mathematical Bulletin*,
6. *Combinatorial Algebraic Geometry Thematic Program*, (book; report on 1 article)
7. *Experimental Mathematics*,
8. *Foundations of Computational Mathematics*,
9. *International Mathematics Research Notices*,
10. *Linear Algebra and its Applications*,
11. *Mathematical Proceedings*,
12. *Mathematics: Frontiers and Perspectives* (conference proceedings),
13. *Proceedings of the Royal Society A* (general science journal)

Letters

Since 2015 Several letters for undergraduate and master students.

Outreach Activities

- 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
- Aug. 8, 2014 **Uni Camp 2014**, *a university summer school for highschool girls*, organizer of the math section.
Saarland University, Saarbücken

Departmental Service

- Aug. 2015 – **Geometry Seminar**, administrative organizer.
May 2017 Texas A&M University
- Feb. 2009 – **AG & Oberseminar Diskrete Mathematik**, administrative organizer.
June 2013 Goethe University
- 2002–2013 **Professoral Hiring Committees**, *member*, two times as undergraduate representative and one time as graduate students and postdocs representative.
Goethe University

Students

PhD Students

- Since July **Henning Seidler**, *Computational and algebraic aspects of SONCs (working title)*.
2017 TU Berlin

Undergraduate Research Students

- Jan. – May **Gerar Nawab**, *reading project about numerical methods for pricing exotic options*.
2017 Texas A&M University
- Jan. – May **Ryan Bailey**, *project about braid group representations over finite fields*.
2017 Texas A&M University; supervised jointly with J. Plavnik
- Since Sep. **Jacob Hartzler**, *project about maximal mediated sets*, see
2016 [Maximal_Mediated_Sets.sage](#).
Texas A&M University
- 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

Undergraduate Thesis Advisor

- 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

Informal Thesis Co-Advisor

- 2013 **Sandra Kiefer**, *Layered Realizations of Polytopes*, Master thesis, informal co-advisor.
Goethe University; principal advisor: T. Theobald
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