

Janin Heuer

Curriculum Vitae

Technische Universität Braunschweig
Institut für Analysis und Algebra
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Employment and Education

- Since April 2019 **PhD student**, *Department of Mathematics, Technische Universität Braunschweig, Braunschweig, Germany.*
Advisor: Timo de Wolff
- 2017 - 2019 **Master of Science in Mathematics**, *Goethe-University Frankfurt, Frankfurt am Main, Germany.*
Advisor: Thorsten Theobald
- 2011 - 2017 **Bachelor of Science in Mathematics**, *Goethe-University Frankfurt, Frankfurt am Main, Germany.*
Advisor: Bastian von Harrach

Awards and Scholarships

Conference Travel Grants

- 2023 **Graduate Student Meeting on Applied Algebra and Combinatorics, Funding for Travel**, *KTH Royal Institute of Technology and Stockholm University.*
- 2021 **SIAM Conference on Applied Algebraic Geometry (online due to COVID-19, Student Travel Award).**

Publications

- Evaluation of Pool-based Testing Approaches to Enable Population-wide Screening for COVID-19**
with T. de Wolff, D. Pflüger, M. Rehme, M.-I. Bittner, *PLoS ONE 15(12): e0243692*, (2020), [arXiv:2004.11851](https://arxiv.org/abs/2004.11851)
- The Martin Gardner Polytopes**
with K. Fritsch, R. Sanyal, N. Schulz, *The American Mathematical Monthly, Vol 127, Issue 7*, (2020), [arXiv:1808.08797](https://arxiv.org/abs/1808.08797)
- Global Optimization via the Dual SONC Cone and Linear Programming**
with M. Dressler, H. Naumann, T. de Wolff, *Proceedings of ISSAC 2020*, (2020), [arXiv:2002.09368](https://arxiv.org/abs/2002.09368)
- Block-sparse Recovery of Semidefinite Systems and Generalized Null Space Conditions**
with F. Matter, M. E. Pfetsch, T. Theobald, *Linear Algebra and its Applications 603: 470-495*, (2020), [arXiv:1907.09442](https://arxiv.org/abs/1907.09442)

Preprints

1. **Initial Application of SONC to Lyapunov Stability of Dynamical Systems**
with T. de Wolff, (2023), see [arXiv:2303.02031](https://arxiv.org/abs/2303.02031)
2. **A Generalized Muirhead Inequality and Symmetric Sums of Nonnegative Circuits**
with N. M. Tran, T. de Wolff, (2022), see [arXiv:2211.07266](https://arxiv.org/abs/2211.07266)
3. **The Duality of SONC: Advances in Circuit-based Certificates**
with T. de Wolff, (2022), see [arXiv:2204.03918](https://arxiv.org/abs/2204.03918)

Theses

1. **"Dünnbesetzte Lösungen von Blocksystemen und semidefinite Optimierung"**
Master of Science in Mathematics, 2019
2. **"Anwendungen der Optimalsteuerung in der Raumfahrt"**
Bachelor of Science in Mathematics, 2017

Talks & Presentations

- March 13-14, 2023 **Research Data in Discrete Mathematics**, *Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany.*
Ad-hoc Presentation
- September 26-29, 2022 **SQUIRREL Retreat**, *Bilm bei Hannover, Germany.*
The Duality of SONC
- October 24-28, 2022 **Real Algebraic Geometry Conference**, *CIRM - Luminy, Centre International de Rencontres Mathématiques, Marseille, France.*
The Duality of SONC (Poster Presentation)
- June 20-24, 2022 **Effective Methods in Algebraic Geometry (MEGA 2022)**, *Kraków, Poland.*
The Duality of SONC (Poster Presentation)
- August 16-20, 2021 **SIAM Conference on Applied Algebraic Geometry (AG21)**, *online due to COVID-19.*
Global Optimization via the dual SONC cone and linear Programming
- December 01-03, 2020 **3rd BYMAT Conference 2020**, *online due to COVID-19.*
Global Optimization via the dual SONC cone and linear Programming
- September 14-17, 2020 **DMV Annual Meeting 2020, Minisymposium "Discrete Optimization"**, *Technische Universität Chemnitz, Germany; online due to COVID-19.*
Global Optimization via the dual SONC cone and linear Programming
- February 10-12, 2020 **WOMBAT- Workshop on Mathematical Physics, Algebra, Analysis and Optimization**, *Ilsenburg, Germany.*
Global Optimization via the dual SONC cone and linear Programming
- October 08, 2019 **Opening Conference for the MATH+ Semester on Algebraic Geometry**, *Technische Universität Berlin, Germany.*
What is a Nonnegativity Certificate?
- June 25, 2019 **Group Seminar Applied Algebra and Analysis**, *Technische Universität Braunschweig, Germany.*
Nullspace Conditions for Block-Sparse Recovery of Semidefinite Systems

- June 07-08, 2019 **Workshop on Applied Algebra**, *Technische Universität Braunschweig, Germany.*
Nullspace Conditions for Block-Sparse Recovery of Semidefinite Systems (Poster Presentation)
- December 17, 2018 **Discrete and Algorithmic Geometry Seminar**, *Technische Universität Berlin, Germany.*
Sparse Solutions of Block-Systems and semidefinite Programming

Activities & Past Events

- March 13-14, 2023 **Research Data in Discrete Mathematics**, *Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany.*
- September 26-29, 2022 **SQUIRREL Retreat**, *Bilm bei Hannover, Germany.*
- October 24-28, 2022 **Real Algebraic Geometry Conference**, *CIRM - Luminy, Centre International de Rencontres Mathématiques, Marseille, France.*
- June 20-24, 2022 **Effective Methods in Algebraic Geometry (MEGA 2022)**, *Kraków, Poland.*
- June 15 - November 18, 2022 **Die 7 größten Abenteuer der Mathematik – Eine bundesweite Veranstaltungsreihe zu den Millennium-Problemen**, *Germany.*
- February 07 - 11, 2022 **POEMA Workshop 4**, *online due to COVID-19.*
- December 13 - 17, 2021 **POEMA Industrial Workshop**, *online due to COVID-19.*
- September 13 - 17, 2021 **POEMA Learning Week 2**, *Toulouse, France, hybrid due to COVID-19.*
- August 16 - 20, 2021 **SIAM Conference on Applied Algebraic Geometry (AG21)**, *online due to COVID-19.*
- July 05 - 16, 2021 **Minicourse on Convex Geometry**, *Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany, online due to COVID-19.*
- June 07 - 11, 2021 **MEGA 2021**, *UiT - The Arctic University of Norway, Tromsø, Norway, online due to COVID-19.*
- January 29 - February 17, 2021 **POEMA 3rd Workshop**, *online due to COVID-19.*
- October 20 - December 12, 2020 **POEMA 2nd Workshop**, *online due to COVID-19.*
- December 01-03, 2020 **3rd BYMAT Conference 2020"**, *online due to COVID-19.*
- September 14 - 17, 2020 **DMV Annual Meeting 2020**, *Technische Universität Chemnitz, Germany, online due to COVID-19.*

- August 24 - **Symmetry, Randomness, and Computations in Real Algebraic Geometry**,
28, 2020 *ICERM, Brown University, Providence, USA, online due to COVID-19.*
- July 21 - 23, **ISSAC 2020**, *Kalamata, Greece, online due to COVID-19.*
2020
- July 13 - 16, **ICMS 2020**, *Technische Universität Braunschweig, Germany, online due to COVID-19.*
2020
- May 27 - **POEMA Online Learning Weeks**, *online due to COVID-19.*
- September
16, 2020
- February **WOMBAT- Workshop on Mathematical Physics, Algebra, Analysis and
10-12, 2020 Optimization**, *Ilsenburg, Germany.*
- January 24, **TGiF - Tropical Geometry in Frankfurt Meeting**, *Johann Wolfgang Goethe-
2020 Universität, Frankfurt am Main, Germany.*
- December 03, **Mathematical Software Day**, *Max Planck Institute for Mathematics in the Sciences,
2019 Leipzig, Germany.*
- October 07 - **Opening Conference for the MATH+ Semester on Algebraic Geometry**,
11, 2019 *Technische Universität Berlin, Germany.*
- September **Convexity Day**, *Max Planck Institute for Mathematics in the Sciences, Leipzig,
09, 2019 Germany.*
- July 09 - 13, **SIAM AG19**, *Universität Bern, Switzerland.*
2019
- June 17 - 21, **MEGA 2020**, *Universidad Complutense de Madrid, Spain.*
2019
- June 07-08, **Workshop on Applied Algebra**, *Technische Universität Braunschweig, Germany.*
2019

Organizational-Management Skills

- June 15 - **Co-Organizer of "Die 7 größten Abenteuer der Mathematik – Eine bun-
November 18, desweite Veranstaltungsreihe zu den Millennium-Problemen"**, *Germany.*
2022
- July 13 - 16, **Local Co-Organizer of ICMS 2020**, *Technische Universität Braunschweig,
2020 Germany.*
- February **Co-Organizer of WOMBAT- Workshop on Mathematical Physics, Algebra,
10-12, 2020 Analysis and Optimization**, *Ilsenburg, Germany.*

Computer skills

- Languages Python, MatLab, Julia, HTML, CSS, JavaScript
- Other Tools \LaTeX , Git
- Operating Systems macOS, Linux

Teaching

TU Braunschweig

- Fall 2022 **"Diskrete Mathematik für Informatiker"**, TA.
lecturer: T. de Wolff
- Fall 2021 **"Machine Learning with Neural Nets"**, TA.
lecturers: T. de Wolff & C. Brauer
- Spring 2021 **"Algebra für Informatiker"**, TA.
lecturer: T. de Wolff
- Fall 2020 **"Diskrete Mathematik für Informatiker"**, TA.
lecturer: T. de Wolff
- Spring 2020 **"Mathematische Algorithmen"**, TA.
lecturer: T. de Wolff
- Fall 2019 **"Kryptographie"**, TA.
lecturer: T. de Wolff
- Fall 2019 **"Diskrete Mathematik"**, TA.
lecturer: T. de Wolff

Goethe-Universität Frankfurt

- Winter 2018 **"Mathematik für Wirtschaftswissenschaftler"**, TA.
lecturer: M. Weba
- Summer 2018 **"Mathematik für Wirtschaftswissenschaftler"**, TA.
lecturer: M. Weba
- Summer 2018 **"Mathematik-Vorkurs für Wirtschaftswissenschaftler"**, TA.
lecturer: M. Weba
- Winter 2017 **"Einführung in die Numerik"**, TA.
lecturer: B. von Harrach
- Winter 2017 **"Mathematik für Wirtschaftswissenschaftler"**, TA.
lecturer: M. Hosseinkouchack
- Winter 2017 **"Mathematik-Vorkurs für Wirtschaftswissenschaftler"**, TA.
lecturer: M. Hosseinkouchack
- Winter 2016 **"Mathematik für Wirtschaftswissenschaftler"**, TA.
lecturer: M. Blonski
- Summer 2016 **"Mathematik für Wirtschaftswissenschaftler"**, TA.
lecturer: M. Weba
- Summer 2016 **"Mathematik-Vorkurs für Wirtschaftswissenschaftler"**, TA.
lecturer: M. Weba
- Winter 2015 **"Mathematik für Wirtschaftswissenschaftler"**, TA.
lecturer: N. Dörmann
- Winter 2015 **"Mathematik für Physiker I"**, TA.
lecturer: S. Jarohs

Summer 2015 **"Mathematik für Physiker II"**, TA.
lecturer: S. Jarohs

Winter 2014 **"Mathematik für Physiker I"**, TA.
lecturer: S. Jarohs