

# Marie-Charlotte Brandenburg

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## Curriculum Vitæ

Current as of October 14, 2021

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[mariebrandenburg.github.io](https://mariebrandenburg.github.io)

## Education and Professional Experience

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- 2020 – today **Max Planck Institute for Mathematics in the Sciences**  
Ph.D. Student  
Research Group: Non-Linear Algebra  
Advisor: Rainer Sinn
- 2019 – 2020 **Berlin Mathematical School | Freie Universität Berlin**  
Ph.D. Student  
Research Groups:  
Discrete Geometry  
Discrete Methods in Algebraic Geometry  
Advisor: Rainer Sinn
- 2019 **Freie Universität Berlin**  
M.Sc. Mathematics  
Master Thesis: *Competitive Equilibrium and Lattice Polytopes*  
Advisor: Christian Haase
- 2017 **Freie Universität Berlin**  
B.Sc. Mathematics  
Bachelor Thesis: *A 4-Simple 4-Simplicial 8-Polytope*  
Advisor: Günter M. Ziegler
- 2016 – 2017 **Minodes GmbH**  
Data Analyst  
Business Intelligence

## Publications and Preprints

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- 2021 **Intersection Bodies of Polytopes**  
joint work with Katalin Berlow, Chiara Meroni and Isabelle Shankar  
[arXiv:2110.05996](https://arxiv.org/abs/2110.05996)
- 2021 **Competitive equilibrium always exists for combinatorial auctions with graphical pricing schemes**  
joint work with Christian Haase and Ngoc Mai Tran  
[arXiv:2107.08813](https://arxiv.org/abs/2107.08813)

- 2021      **Investigation of hydro-mechanical processes in fluid-saturated fractured rock based on numerical model generation**  
 joint work with Nele Pollmann, Julia Gallas, Lucas Witte and Tobias Backers  
*IOP Conference Series: Earth and Environmental Science*, 833(1):012107, August 2021  
[doi:10.1088/1755-1315/833/1/012107](https://doi.org/10.1088/1755-1315/833/1/012107)
- 2020      **Multivariate Volume, Ehrhart and  $h^*$ -Polynomials of Polytopes**  
 joint work with Sophia Elia and Leon Zhang  
[arXiv:2006.01920](https://arxiv.org/abs/2006.01920)

## Research Talks

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### The Positive Tropicalization of Rank 2 Matrices

- 2021      Nonlinear Algebra Seminar  
*Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany*

### Multivariate Volume, Ehrhart and $h^*$ -Polynomials of Polytopes

- 2020      Research Seminar Discrete Geometry  
*Freie Universität Berlin, Germany*

### Product-Mix Auctions, Competitive Equilibrium and Lattice Polytopes

- 2019      Research Seminar Algebra and Geometry  
*Otto-von-Guericke-Universität Magdeburg, Germany*
- 2018      Colloquium  
*Graduate School "Facets of Complexity", Berlin, Germany*

## Posters

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- 2019      **Multivariate Volume, Ehrhart and  $h^*$ -Polynomials of Polytopes**  
 Conference for Women in Algebra and Symbolic Computation  
*Bad Dürkheim, Germany*

## Teaching

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- 2020      **Linear Algebra II**  
 aimed at first-year math students  
 Teaching Assistant  
*Freie Universität Berlin*
- 2019      **Panorama der Mathematik**  
 aimed at first-year math teachers in training  
 Teaching Assistant  
*Freie Universität Berlin*

2018      **Geometry**  
aimed at advanced bachelor and early master students  
Teaching Assistant  
*Freie Universität Berlin*

## Service

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2019 - 2021    Co-organizer for a reading group on toric geometry  
2019           Co-organizer of the Workshop *MATH+ Algebraic Geometry Research Retreat*

## Extended Stays

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06/2019 –    **Max Planck Institute for Mathematics in the Sciences**  
09/2019      Leipzig, Germany  
Research Group: Non-Linear Algebra

01/2019 –    **Simons Institute for the Theory of Computing**  
02/2019      Berkeley, CA, USA  
Program: Geometry of Polynomials