Moritz Grillo

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Personal Information

Address	Kiautschoustraße 5 13353 Berlin
Date of Birth	July, 1995
Place of Birth	Aachen, Germany
Personal Homepage	https://moritzgrillo.gitlab.io/

Professional Experiences

2022 | 07 – today	**Doctoral Researcher** Combinatorial Optimization and Graph Algorithms Institute of Mathematics, TU Berlin
2021 | 04 – 2021 | 09	**Student Assistant** Chair of Bioinformatics, Insitute of Mathematics, University of Greifswald
2018 | 10 – 2019 | 07	**Student Assistant** Chair of Algebra and Functionalanalytical Applications, Chair of Analysis Insitute of Mathematics, University of Greifswald

Education

2022 | 07 – today	**Ph.D. Mathematics (in progress)**, Expressivity of neural networks TU Berlin
2020 | 04 – 2022 | 08	**M. Sc. Mathematics (1.2)**, Thesis: Dynamic programming and semi-coalgebras, University of Greifswald
2019 | 08 – 2019 | 12	Exchange Semester Universidade Federal de Santa Catarina Florianopolis, Brazil
2016 | 10 – 2020 | 07	**B. Sc. Mathematics (1.1)**, Thesis: Translation-invariant Markov semigroups on compact groups and quantum groups, University of Greifswald

Publications

[1] Marie Brandenburg, Moritz Grillo and Christoph Hertrich
Decomposition Polyhedra of Piecewise Linear Functions
Spotlight (top 5%) at the Thirteenth International Conference on Learning Representations, 2025.

[4] Moritz Grillo, Christoph Hertrich and Georg Loho
Depth-Bounds for Neural Networks via the Braid Arrangement
Submitted to the 38th Annual Conference on Learning Theory, 2025.

[2] Vincent Froese, Moritz Grillo and Martin Skutella
Complexity of Deciding Injectivity and Surjectivity of ReLU Neural Networks
Submitted to the 38th Annual Conference on Learning Theory, 2025.

[3] Ekin Ergen and Moritz Grillo
Topological Expressivity of ReLU Neural Networks
The 37th Annual Conference on Learning Theory, 2024.

Google Scholar `https://scholar.google.com/citations?user=VoeZdCQAAAAJhl=de`

Teaching Experiences

WS 24/25 **Algorithmic and Discrete Mathematics**, Teaching assistant, (Bachelor / Master course)
SS 21 **Discrete Modeling in Biology**, Student assistant (Bachelor / Master course)
SS 19 **Linear Algebra II**, Student assistant (Bachelor course)
SS 19 **Analysis II**, Student assistant (Bachelor course)
WS 18/19 **Linear Algebra I**, Student assistant (Bachelor course)
WS 18/19 **Analysis I**, Student assistant (Bachelor course)

Scholarships

2019 – 2022 **Stipendium Studienstiftung**, Studienstiftung des deutschen Volkes e.V.
2018 – 2019 **Deutschlandstipendium**, German Federal Ministry of Education and Research

Talks

2024 | 06 | 30 **Topological expressivity of ReLU neural networks**
37th Annual Conference on Learning Theory, Edmonton

2024 | 06 | 07 **Complexity of deciding injectivity and surjectivity of ReLU neural networks**
Workshop on Multiple Perspectives in Optimization, Klagenfurt

2024 | 05 | 13 **Complexity of deciding injectivity and surjectivity of ReLU neural networks**
DISCOGAKT Seminar, Berlin

2024 | 02 | 08 **Topological expressivity of ReLU neural networks**
Research Seminar DIGO: Discrete Mathematics, Geometry and Optimization, Frankfurt

2023 | 10 | 26 **Topological expressivity of ReLU neural networks**
Discrete Geometry and Topological Combinatorics Seminar, Berlin

2023 | 02 | 21 **Topological expressive power of ReLU neural networks**
DISCOGA Seminar, Berlin

2023 | 11 | 01 **Dynamic programming and semi-coalgebras**
DISCOGA Seminar, Berlin

Further activities

Reviews for	Intenational Conference on Learning Representations IEEE Journal of Selected Topics in Signal Processing
2025 | 02	**Workshop on Polytopes, Osnabrück** Poster: Deomposition Polyhedra of Piecewise Linear Functions
2024 | 10 | 18	**MATH+ Day** Poster: Expressivity of neural networks
SS 24	**Research Seminar Polytopes and Algebraic Geometry, FU Berlin** Topic: K-rings of wonderful varieties and matroids Talk: Matroid fans and their Chow ring
2023 | 10 | 20	**MATH+ Day** Poster: Expressivity of neural networks
SS 23	**Research Seminar Polytopes and Algebraic Geometry, FU Berlin** Topic: Mixed volume of normal complexes Talk: Normal complexes
2023 | 02	**Workshop: Fourier Analysis of Polytopes, FU Berlin** Talk: Fourier Analysis
2022 | 11 | 18	**MATH+ Day** Poster: Expressivity of neural networks
WS 22/23	**Research Seminar Polytopes and Algebraic Geometry, FU Berlin** Topic: Ehrhart rings of IDP lattice polytopes Talk: Local cohomology and Ext functor

Outreach

2024 | 12	MATH+ Advent Calendar Wise Thanks to AI?

Language Skills

German	Native Language
English	C1
Portuguese	B2
Spanish	B1
French	B1

Computer Skills

LaTeX
Python
Sage
Gurobi

Social Activities

2022 | 10 – today	German courses for refugees KUB Berlin e.V.
2018 | 01 – 2019 | 01	Member of the Student Council Mathematics/Biomathematics University of Greifswald

References

Martin Skutella
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Christian Haase
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