



M. Levent Doğan

M.Sc.

SUMMARY STATEMENT

I am a PhD student at TU Berlin and a Berlin Mathematical School Phase 2 student.

My supervisor is Prof. Dr. Peter Bürgisser.

I am interested in computational problems in the areas of algebra, geometry and combinatorics.

My main research is on geometric complexity theory and geometric invariant theory.

PUBLICATIONS

1) Polynomial Time Algorithms in Invariant Theory for Torus Actions

In 36th Computational Complexity Conference (CCC 2021).

with Peter Bürgisser, Visu Makam, Michael Walter and Avi Wigderson.

[DOI: 10.4230/LIPIcs.CCC.2021.32](#)

[arXiv: 2102.07727](#)

2) The Multivariate Schwartz-Zippel Lemma

In SIAM Journal on Discrete Mathematics. Vol. 36, Iss. 2 (2022).

with Alperen A. Ergür, Jake D. Mundo and Elias Tsigaridas.

[DOI: 10.1137/20M1333869](#)

[arXiv: 1910.01095](#)

2) On the Complexity of Chow and Hurwitz Forms

In ACM Communications in Computer Algebra. Vol. 57, Iss. 4 (2024).

with Alperen A. Ergür and Elias Tsigaridas.

[DOI: 10.1145/3653002.3653003](#)

[arXiv: 2202.11582](#)

PREPRINTS

3) Deterministic Approximation Algorithms for Volumes of Spectrahedra

with Jonathan Leake and Mohan Ravichandran.

[arXiv: 2211.12541](#)

GRANTS AND AWARDS

• 2019 - present

ERC Grant 787840

European Union's Horizon 2020 research programme

• 2019 - present

Berlin Mathematical School

Admission to Phase 2 studies

• 2017-2019

Berlin Mathematical School

Scholarship for Phase 1 studies

• 2014-2017

Middle East Technical University and TUBITAK

Scholarship for Science Studies

• 2014

National University Admission Exam

55th place among >1.5 million participants

• 2013

5th National Human Sciences Olympiads

1st degree for Philosophy



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Berlin, Germany

EDUCATION

PhD 11/2019-present

Technische Universität Berlin

Berlin Mathematical School Phase 2

Subject: Mathematics

Supervisor: Prof. Dr. Peter Bürgisser

Master's Degree 10/2017-11/2019

Technische Universität Berlin

Berlin Mathematical School Phase 1

Subject: Mathematics

Grade: 1.0 (Excellent)

Bachelor's Degree 09/2014-08/2017

Middle East Technical University

Subject: Mathematics

CGPA: 3.99

EXPERTISE

Programming Languages

- Python, C, C++, Java
- SageMath
- Julia
- Macaulay2

Languages

- Turkish (native)
- English (fluent)
- German (B2)

TEACHING EXPERIENCE

- **10/2022 - 04/2023** Teaching Assistant
TU Berlin - Algebra I
 - **2021 - present** Mentor at a Directed Reading Program
I have mentored 3 students at DRP Türkiye
 - **2016** Student Assistant
Middle East Technical University
 - **2015** Student Assistant
Middle East Technical University
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RESEARCH VISITS

- **11/2023** I visited my co-author Michael Walter
Ruhr University Bochum
 - **12/2022** I visited my co-author Alperen A. Ergür
University of Texas at San Antonio
 - **06/2022** I visited my co-author Michael Walter
Ruhr University Bochum
 - **09/2021** I visited my co-author Elias Tsigaridas
Inria Paris
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CONFERENCES AND TALKS

- **07/2023** SIAM Conference on Applied Algebraic Geometry 2023
Eindhoven
I gave a talk in the minisymposium *Efficient Symbolic and Numerical Algorithms for Polynomial Systems*
- **06/2023** Foundations of Computational Mathematics (FOCM) 2023
Paris
- **06/2023** 25th Conference of the International Linear Algebra Society
Madrid
I gave a talk in the minisymposium *Semidefinite matrices: geometry and optimization*
- **11/2022** Dies Mathematicus event
I presented my master's thesis at TU Berlin
- **09/2022** Peterfest: Geometry in Complexity and Computations
Konstanz
- **07/2022** Math+ P-NP event
I gave a "What is..." seminar talk on the PCP Theorem
- **04/2022** Seminar on Geometry, Probability, and Computing
Talk at the colloquium of University of Texas San Antonio.
- **08/2021** SIAM Conference on Applied Algebraic Geometry 2021
I gave a talk at the virtual minisymposium *Applied Invariant Theory: Statistics and Algorithms*
- **08/2021** Seminar on Nonlinear Algebra
Leipzig
I gave a talk at the colloquium of MPI MiS
- **07/2021** Computational Complexity Conference 2021
I gave a talk at the virtual conference on the accepted paper *Polynomial Time Algorithms in Invariant Theory for Torus Actions*
- **02/2020** Milestone Conference of the Thematic Einstein Semester
Berlin
I gave a talk on my preprint *The Multivariate Schwartz-Zippel Lemma*