

Alperen Ali Ergür

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Education

2016	PhD in Mathematics - <i>Texas A&M University, USA</i>
2011	MS in Mathematics- <i>Tobb University, Turkey</i>
2009	BS in Mathematics- <i>Bilkent University, Turkey</i>

Employment

Aug 2020-present	University of Texas at San Antonio <i>Assistant Professor</i> Mathematics Department
Sep 2019-Aug 2020	Carnegie Mellon University, Theoretical Computer Science Group <i>Postdoctoral Fellow</i> Mentors: Venkatesan Guruswami and Pravesh Kothari
May 2017-Aug 2019	Technical University of Berlin, Algorithmic Algebra Group <i>Einstein Postdoctoral Fellow</i> Mentors: Peter Bürgisser and Felipe Cucker
Aug 2016-May 2017	North Carolina State University, Symbolic Computation Group <i>Postdoctoral Research Scholar</i> Mentor: Cynthia Vinzant
Sep 2011-Aug 2016	Texas A&M University, Functional Analysis and Algebraic Geometry Groups <i>Graduate Research/Teaching Assistant, and REU Instructor</i> Mentors: Grigoris Paouris and J. Maurice Rojas

Teaching Experience

1. University of Texas at San Antonio

- *Mentoring:*
Jesus Rebollo-Bueno (postdoctoral scholar), Quinn Murphey (undergraduate student), Abigail Martinez (M.S. student)
- *Courses developed for Mathematics of Data and Computing B.S. degree*
Probability and Computing
Introduction to Optimization (with C. Walton)
- *Courses developed for grad students in Math, CS and Engineering*
Probability Theory and Computing
High Dimensional Probability with Algorithmic Applications
- *Instructor of the Record:*
Linear Algebra, Probability and Computing, Abstract Algebra

2. Technische Universität Berlin

- *Graduate Seminar:* Interior Point Methods in Convex Optimization (with T. de Wolff)
- *Graduate Class:* Effective Algebraic Geometry (with P. Bürgisser, J. Tonelli-Cueto)
- Worked closely with PhD students Josue Tonelli-Cueto and M. Levent Dogan

3. NC State University

- Instructor of the Record for the following courses
Linear Algebra for Science Majors, Calculus for Engineers, Precalculus

4. Texas A&M University

- *Assistant Instructor at Research Experience for Undergraduates Program (REU)*
Mentored eight undergraduate research projects in four summers: 2013-2016
- Recitation Leader for Graduate Algebra, Probability, Advanced Calculus, Calculus

Grants, Awards, etc

- July 2021** NSF-CCF-2110075, Algorithmic Foundations directory, starting 10/01/21
Title: Beyond Worst-Case Analysis for Computing with Polynomials
- Jan 2017** Postdoctoral Fellowship by Einstein Foundation
- Jun 2015** Travel Grants by University of Trento and Institut Henri Poincare
- April 2014** AMS Travel Grant for Graduate Students
- Sept 2009** Full Scholarship by Tobb University including tuition and stipend
- Sept 2004** Full Scholarship by Bilkent University including tuition and stipend
- < 2004** Two Bronze, One Silver Medal in National Math Competitions

Research Interest

Discrete and Convex Geometry, Real Algebraic Geometry, Convex Optimization, Randomized Numerical Analysis, Theory of Computation

Publications and Preprints

Articles listed below are available at https://arxiv.org/a/ergur_a_1.html

1. Multihomogenous Nonnegative Polynomials and Sums of Squares
Discrete & Computational Geometry, 2018
<https://doi.org/10.1007/s00454-018-0011-3>
2. Probabilistic Condition Number Estimates for Real Polynomials I
(with G. Paouris and J.M. Rojas)
Foundations of Computational Mathematics, 2019
<https://doi.org/10.1007/s10208-018-9380-5>
3. Approximating Nonnegative Polynomials via Spectral Sparsification
SIAM Journal on Optimization, 2019
<https://doi.org/10.1137/17M1121743>
4. Tropical Varieties for Exponential Sums (with G. Paouris and J.M. Rojas)
Mathematische Annalen, 2020
<https://doi.org/10.1007/s00208-019-01808-5>
5. On the Expected Number of Zeros of Random Fewnomials
(with P. Bürgisser and J. Tonelli-Cueto)
SIAM Journal on Applied Algebra and Geometry (SIAGA), 2019
<https://doi.org/10.1137/18M1228682>
6. Smoothed Analysis for the Condition Number of Structured Real Polynomial Systems
(with G. Paouris and J.M. Rojas)
Mathematics of Computation, 2021
<https://doi.org/10.1090/mcom/3647>
7. On the Complexity of Plantinga-Vegter Algorithm
(with F. Cucker and J. Tonelli-Cueto)
ACM Symposium on Symbolic and Algebraic Computation (ISSAC), 2019
<https://doi.org/10.1145/3326229.3326252>
Minor Revision @ Discrete & Computational Geometry
8. The Rank of Sparse Random Matrices
(with A. Coja-Oghlan, Pu Gao, S. Hettereich, H. Rolvien)
ACM Symposium on Discrete Algorithms (SODA), 2020
<https://doi.org/10.1137/1.9781611975994.35>
Minor Revision @ Random Structures and Algorithms
9. The Multivariate Schwartz-Zippel Lemma
(with L. Dogan, J. Mundo, E. Tsigaridas)
Accepted @ SIAM Journal of Discrete Mathematics
10. A Polyhedral Homotopy Algorithm for Real Zeros
(with T. de Wolff)
Under Review @ Arnold Mathematical Journal
11. Functional Norms, Condition Numbers, and Numerical Algorithms in Algebraic Geometry
(with F. Cucker, J. Tonelli-Cueto)
Minor Revision @ Forum Mathematics Sigma

Some Talks

Jul 2021	Mathematical Congress of Americas, Buenos Aires, Argentina
Jun 2021	Effective Methods in Algebraic Geometry, MEGA 2021, Tromso Norway
Sept 2020	Data Seminar, U Missouri Columbia
Mar 2020	ACO Seminar, Carnegie Mellon University
Jul 2019	SIAM Conference on Applied Algebraic Geometry 2019, Bern
Jun 2019	Effective Methods in Algebraic Geometry (MEGA) 2019, Madrid
Apr 2019	Computational Geometry Workshop, Schloss Dagstuhl, Germany
Feb 2019	Universität Bonn, Theoretical Computer Science Seminar
Nov 2018	Goethe Universität Frankfurt, Applied Discrete Mathematics Seminar
Oct 2018	U Missouri Columbia, Convex Geometry Seminar
Mar 2018	Emerging Trends in Geometric Functional Analysis, Banff Creativity Centre
Dec 2017	Methods on Discrete Structures Lecture Series, TU Berlin
Nov 2017	Algebra Meets Numerics Workshop, Berlin Academy of Sciences
Mar 2017	U Michigan Ann Arbor, Analysis and Probability Seminar
July 2016	Geometric Functional Analysis Concentration Week, Texas A&M
Apr 2016	MIT, LIDS Seminar
Apr 2016	Georgia Tech, Algebra Seminar
Mar 2016	Univ of Chicago, Scientific Computing Seminar
Mar 2016	NC State University, Symbolic Computation Seminar
Dec 2015	Colorado State University, FRAGMENT Seminar
Oct 2015	Technical University of Munich, Applied Geometry Seminar, Germany
Sept 2015	University of Athens, Convex Geometric Analysis Seminar, Greece

Service

2021+	Organizer, Geometry, Probability, and Computing Seminar A student accessible research seminar co-organized with G. Paouris and P. Valettas
2020+	Member of the Committee to design Mathematics of Computation and Data: New B.S. degree jointly offered by Mathematics and Computer Science departments
July 2021	Organizer, Mathematical Congress of Americas Minisymposia: Numeric-Symbolic Computation with Polynomials
July 2019	Organizer, SIAM Applied Algebraic Geometry Minisymposia: Numerical Methods for Structured Polynomial System Solving
Fall 2017	Organizer, Algorithmic Algebra OberSeminar, TU Berlin
Jan 2016	Organizer, Combinatorial Algebraic Geometry Workshop, Nesin Math Village
Nov 2014	Member of Power Team, Texas A&M High School Contest

References

Teaching Timothee Bryan (Term Assistant Professor of Mathematics, George Mason University)
Amin Coja-Oghlan (Professor of Discrete Mathematics, Goethe Universität Frankfurt)
Peter Bürgisser (Professor of Algorithmic Algebra, Technical University of Berlin)
Felipe Cucker (Professor of Mathematics, City University of Hong Kong)
Pravesh Kothari (Assistant Professor of Computer Science, Carnegie Mellon University)
Grigoris Paouris (Professor of Mathematics, Texas A&M University)
J.Maurice Rojas (Professor of Mathematics and Computer Science, Texas A&M University)
Cynthia Vinzant (Assistant Professor of Mathematics, University of Washington, Seattle)