Zafeirakis Zafeirakopoulos

Curriculum Vitae

Institute of Information Technologies
Gebze Technical University
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PK141, 41400 Gebze, Kocaeli, TURKEY

Personal Info

Gender	Male
Date of birth	June 11, 1982
Nationality	Greek

Education

2012 **Doctor in Technical Sciences**, *Johannes Kepler University*,
Research Institute for Symbolic Computation (RISC).
Thesis: Linear Diophantine Systems: Partition Analysis and Polyhedral Geometry
Advisors Peter Paule and Matthias Beck

2008 **Master's in Computational Science**, *University of Athens*,
Department of Informatics and Telecommunications, *GPA – 8.72/10*.
Thesis: Study and Benchmarks for Real Root Isolation methods
Advisor Ioannis Emiris

2005 **Bachelor's in Mathematics**, *University of Athens*,
Department of Mathematics, *GPA – 7.2/10*.
Majors: Applied Mathematics and Computational Mathematics

Languages

Native	Greek	
Fluent	English	*Cambridge Proficiency, July 2004*
Good	German	*Mittelstufe, July 1999*
Good	French	*DELF II, July 1998*
Basic	Turkish	*Basic Conversations*
Basic	Spanish	*Basic words and phrases*

Research Interests

Linear Diophantine Systems	Polyhedral Geometry
Partition Analysis	Orthogonal Designs
Integer Linear Optimization	Gröbner bases
Enumerative Combinatorics	Symbolic Computation
Algebraic Combinatorics	Algorithms

Project Funding

Jun 2019 - Jun 2021	**Gröbner Bases, Resultants and Polyhedral Geometry - GRAPE**, *TUBITAK 2509 - Bilateral Project with France*, ~50k €.
Oct 2017 - Oct 2020	**Heterogeneous Algorithms for Combinatorics, Geometry, Optimization and Number Theory - HALCYON**, *TUBITAK 3501*, ~80k €.
Sep 2017 - Mar 2019	**A system for efficient representation of mathematical data and benchmarking of mathematical software and algorithms**, *TUBITAK 3001*, ~17k €.
Jul 2018 - Dec 2019	**Algebraic Motion Planning**, *Reasearch Council of Gebze Technical University*, ~3k €.
Aug 2016 - Feb 2017	**Parallel Computation of Discrete and Continuous Volume**, *Reasearch Council of Gebze Technical University*, ~3k €.

Awards and Scholarships

Scholarship

Jan-Jun 2012 USA	Marshall Plan Scholarship (Research Visit to San Francisco State University) Advisor: Prof. Matthias Beck

Student Supervision

PhD Students

2019-	Gizem Süngü	*GTU*

Master's Students

2019	Nurdan Ünlü (co-advisor)	*MSGSU*
2019	Büşra Sert (co-advisor)	*MSGSU*
current	Umutcan Önal	*GTU*
current	Meryem Özkan	*GTU*
current	Başak Karakaş	*GTU*

Teaching

2019-	Probability and Statistics @ Gebze Technical University	*Undergrad*
2016-	Symbolic Computation @ Gebze Technical University	*Grad*
2017-	Algorithm Design and Analysis @ Gebze Technical University	*Grad*
2016-	Discrete Mathematics @ Gebze Technical University	*Undergrad*
2017-	Theory of Computation @ Gebze Technical University	*Undergrad*
2016	Signals and Systems @ Gebze Technical University	*Undergrad*
2005-2007	Teaching Assistant in various courses in the University of Athens, including "Discrete Mathematics" and "Numerical Analysis" in the Informatics and Telecommunications Department and "Computer Graphics" and "Basic computer skills" in the Mathematics Department.	

Professional Experience

Faculty Position

Mar 2016 -
today
Gebze Technical University - Institute of Information Technologies.
Assistant Professor

Postdoctoral Researcher Positions

Jul 2015 -
Feb 2016
Galatasaray University, *Project 113F293 (TUBITAK 1001)*,
Izole Olmayan Rasyonel Tekilliklerin Denklemleri ve Değişmezleri.
PI: Prof Meral Tosun

Dec 2014 -
Feb 2016
University of Athens, *Research Project ΘΑΛΗΣ*,
Advanced Geometric Computing and Critical Applications.
PI: Prof Ioannis Emiris

Dec 2012 -
Dec 2013
Johannes Kepler University - Research Institute for Symbolic Computation,
Algorithmic Combinatorics Group (various projects),
Partition Analysis.
PIs: Prof. Peter Paule, Dr. Veronika Pillwein, Dr. Carsten Schneider

Researcher Positions

Jan 2011 -
Nov 2012
Johannes Kepler University - Research Institute for Symbolic Computation,
Algorithmic Combinatorics.
PI: Prof. Peter Paule

Oct 2009 -
Dec 2010
Johannes Kepler University - Research Institute for Symbolic Computation,
Doctoral Program "Computational Mathematics" - DK6,
Computer Algebra Tools for Special Functions in Numerical Analysis.
PI: Prof. Peter Paule

Apr 2009 -
Jun 2009
Johannes Kepler University - Research Institute for Symbolic Computation,
Doctoral Program "Computational Mathematics" - DK11,
Rational Parametric Algebraic Curves.
PI: Prof. Franz Winkler

Jan 2008 -
Mar 2008
University of Athens, *European Project under FP7*,
Algorithms for Complex Shapes.
PI: Prof. Ioannis Emiris

Jun 2006 -
Jul 2006
University of Athens, *Pythagoras Project*,
Distributed Iterative Methods for Numerical Solving of Convection Diffusion with
application to atmospheric models.
PI: Prof. Nikolaos Misirlis

Other Positions

Jan 2014 - Oct 2014 — **Hellenic Army (Compulsory Service)**, *Hellenic Army General Staff*,
Program Analyst/Software Developer.

Apr 2007 - Dec 2007 — **Greek Ministry of Tourism**, *Department of Informatics and New Technologies*,
Network admin, Network/Technical support and consulting.

Apr 2007 - Dec 2007 — **National Center of Scientific Research "ΔΗΜΟΚΡΙΤΟΣ"**, *Internship in the Institute of Material Science*,
FORTRAN-Java Software Engineer.
Supervisor: Dr. Andreas Theophilou

2003 - 2006 — **University of Athens**, *Computer Lab Assistant (Mathematics Department)*,
Lab Assistant.
Supervisor: Assoc. Prof. Evagelos Raptis

Research Activities

Jul 2019	RISC (Austria) -Visiting Dr. Veronika Pillwein	*Research visit*
Jan 2018	RISC (Austria) -Visiting Dr. Veronika Pillwein	*Research visit*
Oct 2017	MSRI (USA) -Geometric and topological combinatorics	*MSRI Workshop*
Nov 2016	AIM (USA) - Partition Theory and Polyhedral Geometry	*AIM Workshop*
Nov 2015	Osnabrück U (Germany) - Visiting Prof. Winfried Bruns	*Research visit*
Nov 2015	U of Athens (Greece) - Visiting Prof. Ioannis Emiris	*Research visit*
Aug 2015	RISC (Austria) -Visiting Prof. Peter Paule	*Research visit*
Nov 2014	IMA (USA) - Geometric and Enumerative Combinatorics	*IMA Workshop*
Aug 2013	PennState U (USA) - Visiting Prof. George Andrews	*Research visit*
Aug 2013	NCSU (USA) - Visiting Prof. Carla Savage	*Research visit*
Nov 2012	AIM (USA) - Partition Theory and Polyhedral Geometry	*AIM SQuaRE*
Nov 2011	AIM (USA) - Partition Theory and Polyhedral Geometry	*AIM SQuaRE*
Jun 2011	UC Davis (USA) - Visiting Prof. Matthias Köppe	*Research visit*
Jun 2011	U of Washington (USA) - Polyhedral Geometry, Symbolics	*SageDays*
Nov 2010	AIM (USA) - Partition Theory and Polyhedral Geometry	*AIM SQuaRE*
Jul 2010	RISC (Austria) - Benchmarks, Special Functions	*SageDays*

Service

Reviewer for Journals

Journal of Combinatorial Theory A	*Elsevier*
European Journal of Combinatorics	*Elsevier*
Special Matrices	*De Gruyter*
Mathematics in Computer Science	*Springer*
International Journal of Combinatorics	*Hindawi*
Turkish Journal of Electrical Engineering & Computer Sciences	*TUBITAK*
PROMS volume: Applications of Computer Algebra 2015	*Springer*

Reviewer for Conferences

International Symposium on Experimental Algorithms (SEA)
Symbolic Numeric Computation (SNC)
SIAM Conference on Geometric and Physical Modeling (SPM)
Int. Symposium on Symbolic and Algebraic Computation (ISSAC)
Computer Algebra in Scientific Computing (CASC)

Master's Thesis Committee member

Seyyed Hamed Mousavi, Sertaç Karahoda, Beril Talay	*Sabancı University*
Ayşegül Yavuz, Baran Usta	*Sabancı University*
Nurdan Ünlü, Büşra Sert	*MSGSU University*
Wuday Colley	*GTU*

Organizer

2019	MACIS: Mathematical Aspects of Computer and Information Sciences	*General Chair*
2014,2015	ACA: Applications of Computer Algebra	*Publicity Chair*
2013,2015	GBReLA: Gröbner Bases, Resultants and Linear Algebra	*Organizer*
2015	PAC: Polytopes - Algebra - Computation	*Organizer*
2004,2005	Intro to Java - Scientific Programming (Math@ U of Athens)	*Organizer*
2004	Open Source: OOP (Math@ U of Athens)	*Organizer*

Lectures in Nesin Mathematics Village

2010	Polynomial System Solving
2011	Solving Linear Diophantine Systems
2012	Number Theory and Polyhedral Geometry
2015	Geometry that counts, Algorithmic Algebraic Geometry
2016	Symbolic Computation
2017	Combinatorial Counting

Publications

In mathematics and theoretical computer science the names of the authors are in alphabetical order.

Journal Papers

[5] Felix Breuer and Zafeirakis Zafeirakopoulos. "Polyhedral Omega: a New Algorithm for Solving Linear Diophantine Systems". In: *Annals of Combinatorics* 21.2 (June 2017), pp. 211–280. ISSN: 0219-3094. DOI: 10.1007/s00026-017-0349-x. URL: https://doi.org/10.1007/s00026-017-0349-x.

[4] Matthias Beck, Benjamin Braun, Matthias Köppe, Carla D. Savage, and Zafeirakis Zafeirakopoulos. "Generating Functions and Triangulations for Lecture Hall Cones". In: *SIAM Journal on Discrete Mathematics* 30.3 (2016), pp. 1470–1479. DOI: 10.1137/15M1036907. eprint: http://dx.doi.org/10.1137/15M1036907. URL: http://dx.doi.org/10.1137/15M1036907.

[3] Angelos Mantzaflaris, Hamid Rahkooy, and Zafeirakis Zafeirakopoulos. "Efficient computation of dual space and directional multiplicity of an isolated point". In: *Computer Aided Geometric Design* 47 (2016). SI: New Developments Geometry, pp. 114–129. ISSN: 0167-8396. DOI: http://dx.doi.org/10.1016/j.cagd.2016.05.002. URL: http://www.sciencedirect.com/science/article/pii/S0167839616300498.

[2] Matthias Beck, Benjamin Braun, Matthias Köppe, Carla D. Savage, and Zafeirakis Zafeirakopoulos. "s-Lecture hall partitions, self-reciprocal polynomials, and Gorenstein cones". English. In: *The Ramanujan Journal* (2014), pp. 1–25. ISSN: 1382-4090. DOI: 10.1007/s11139-013-9538-3. URL: http://dx.doi.org/10.1007/s11139-013-9538-3.

[1] Christos Koukouvinos, Veronika Pillwein, Dimitris E. Simos, and Zafeirakis Zafeirakopoulos. "On the average complexity for the verification of compatible sequences". In: *Information Processing Letters* 111.17 (2011), pp. 825–830. ISSN: 0020-0190. DOI: DOI:10.1016/j.ipl.2011.05.015. URL: http://www.sciencedirect.com/science/article/pii/S0020019011001438.

Conference Papers

[6] Umutcan Önal and Zafeirakis Zafeirakopoulos. "A Machine Learning Framework For Volume Prediction". In: *Special Event on Analysis of Experimental Algorithms (SEA2 2019)*. Springer International Publishing, 2019.

[5] Vissarion Fisikopoulos and Zafeirakis Zafeirakopoulos. "Experimental Study of the Ehrhart Interpolation Polytope". In: *Mathematical Aspects of Computer and Information Sciences: 7th International Conference, MACIS 2017, Vienna, Austria, November 15-17, 2017, Proceedings*. Ed. by Johannes Blömer, Ilias S. Kotsireas, Temur Kutsia, and Dimitris E. Simos. Cham: Springer International Publishing, 2017, pp. 320–324. ISBN: 978-3-319-72453-9. DOI: 10.1007/978-3-319-72453-9_26. URL: https://doi.org/10.1007/978-3-319-72453-9_26.

[4] Ioannis Z. Emiris, Anna Karasoulou, Eleni Tzanaki, and Zafeirakis Zafeirakopoulos. "On the space of Minkowski summands of a convex polytope". In: EuroCG '16. Lugano, Switzerland, 2016. URL: http://www.eurocg2016.usi.ch/sites/default/files/paper_76.pdf.

[3] Ioannis Z. Emiris, Christos Konaxis, and Zafeirakis Zafeirakopoulos. "Minkowski Decomposition and Geometric Predicates in Sparse Implicitization". In: *Proceedings of the 40th International Symposium on Symbolic and Algebraic Computation*. ISSAC '15. Bath, UK, 2015.

[2] Christos Koukouvinos, Dimitris E Simos, and Zafeirakis Zafeirakopoulos. "A Gröbner Bases Method for Complementary Sequences". In: 2013, p. 255.

[1] Michael Hemmer, Elias P. Tsigaridas, Zafeirakis Zafeirakopoulos, Ioannis Z. Emiris, Menelaos I. Karavelas, and Bernard Mourrain. "Experimental evaluation and cross-benchmarking of univariate real solvers". In: *Proceedings of the 2009 conference on Symbolic numeric computation*. SNC '09. Kyoto, Japan: ACM, 2009, pp. 45–54. ISBN: 978-1-60558-664-9. DOI: 10.1145/1577190.1577202. URL: http://doi.acm.org/10.1145/1577190.1577202.

Theses

[2] Zafeirakis Zafeirakopoulos. "Linear Diophantine Systems: Partition Analysis and Polyhedral Geometry". PhD thesis. Johannes Kepler University, Dec. 2012.

[1] Zafeirakis Zafeirakopoulos. "Study and Benchmarks for Real Root Isolation methods". MA thesis. Departments of Informatics and Telecommunication, Dec. 2008.

Posters, Technical Reports and Other

[7] Vissarion Fisikopoulos, Matthias Henze, and Zafeirakis Zafeirakopoulos. *Interpolation and Ehrhart Theory*. 2013.

[6] Felix Breuer and Zafeirakis Zafeirakopoulos. *Partition Analysis via Polyhedral Geometry*. New York, NY, USA, 2012.

[5] Zafeirakis Zafeirakopoulos. *Partition Analysis and Polyhedral Geometry*. MAA Golden Section poster. 2012.

[4] Christos Koukouvinos, Dimitris E. Simos, and Zafeirakis Zafeirakopoulos. *An algebraic framework for extending orthogonal designs*. New York, NY, USA, July 2011. DOI: 10.1145/2016567.2016587. URL: http://doi.acm.org/10.1145/2016567.2016587.

[3] Hamid Rahkooy and Zafeirakis Zafeirakopoulos. *Using resultants for inductive Gröbner bases computation*. New York, NY, USA, July 2011. DOI: 10.1145/2016567.2016593. URL: http://doi.acm.org/10.1145/2016567.2016593.

[2] Christos Koukouvinos, Veronika Pillwein, Dimitris E. Simos, and Zafeirakis Zafeirakopoulos. *A Note on the Average Complexity Analysis of the Computation of Periodic and Aperiodic Ternary Complementary Pairs*. Research Report. Oct. 2010. URL: https://www.dk-compmath.jku.at/dk-reports/dk-report-10-08/at_download/file.

[1] Ioannis Emiris, Michael Hemmer, Menelaos Karavelas, Sebastian Limbach, Bernard Mourrain, Elias P. Tsigaridas, and Zafeirakis Zafeirakopoulos. *Cross-benchmarks of univariate algebraic kernels*. 2008.

Conferences and Workshops

2019 **OPSFA - Orthogonal Polynomials, Special Functions and Applications**, *Hagenberg, Austria*, Presented in minisymposium.

2019 **SIAM AAG - SIAM Applied Algebraic Geometry**, *Bern, Switzerland*, Presented in minisymposium.

2019 **SEA - International Symposium on Experimental Algorithms**, *Kalamata, Greece*, Paper.

2017 **MACIS - International Conference on Mathematical Aspects of Computer and Information Sciences**, *Vienna, Austria*, Presented a paper.

2017 **Geometric and topological combinatorics**, *MSRI Workshop*, Berkeley, CA, USA.

2017 **2nd Turkish Romanian Mathematics Workshop**, *Galatasaray University*, Istanbul, Turkey, Presented a talk.

2017 **Antalya Algebra Days**, *Nesin Mathematics Village*, Sirince, Turkey, Presented a paper.

2016 **Singularities**, *Galatasaray University*, Istanbul, Turkey, Organizer, Presented a talk.

2015 **GBReLA - Gröbner Bases, Resultants and Linear Algebra**, *Applications of Computer Algebra (ACA)*, Kalamata, Greece, Organizer.

2015 **PAC - Polytopes Algebra Computation**, *Applications of Computer Algebra (ACA)*, Kalamata, Greece, Organizer.

2015 **ACA - Applications of Computer Algebra**, Kalamata, Greece, Publicity chair.

2014 **Geometric and Enumerative Combinatorics**, *Institute for Mathematics and its Applications*, Minneapolis, Minnesota, USA.

2014 **ACA - Applications of Computer Algebra**, New York, USA, Publicity chair.

2014 **ACAC - Athens Colloquium on Algorithms and Complexity**, Athens, Greece, Presented a talk.

2013 **EuroCG - European Workshop on Computational Geometry**, Braunschweig, Germany.

2013 **ACA - Applications of Computer Algebra**, Malaga, Spain, Presented a talk.

2013 **GBReLA - Gröbner Bases, Resultants and Linear Algebra**, *RISC*, Hagenberg, Austria, Organizer.

2013 **SIAM AG - Applications of Algebraic Geometry**, Fort Collins, Colorado, USA, Presented a talk.

2012 **BADMath**, *UC Berkeley*, Berkeley, CA, USA.

2012 **MAA Golden Section meeting**, *MSRI*, Berkeley, CA, USA.

2012 **ISSAC - International Symposium on Symbolic and Algebraic Computation**, Grenoble, France, Presented a poster.

2011   **SNC - Symbolic Numeric Computation**, San Jose, CA, USA.

2011   **ISSAC - International Symposium on Symbolic and Algebraic Computation**, San Jose, CA, USA, Presented two posters.

2010   **ACAC - Athens Colloquium on Algorithms and Complexity**, Athens, Greece.

2010   **ISSAC - International Symposium on Symbolic and Algebraic Computation**, Munich, Germany.

2009   **SNC - Symbolic Numeric Computation**, Kyoto, Japan, Presented a paper.

2009   **FPSAC - International Conference on Formal Power Series and Algebraic Combinatorics**, Hagenberg, Austria.

2009   **ACAC - Athens Colloquium on Algorithms and Complexity**, Athens, Greece.

2008   **Panhellenic Conference in Algebra,Number Theory and Applications**, Athens, Greece.

2008   **ACAC - Athens Colloquium on Algorithms and Complexity**, Athens, Greece.

2008   **RTA - Rewriting Techniques and Applications**, *RISC*, Hagenberg, Austria.

2008   **EuroCG - European Workshop on Computational Geometry**, Nancy, France.

2008   **ISSAC - International Symposium on Symbolic and Algebraic Computation**, Hagenberg, Austria.

2007   **ACAC - Athens Colloquium on Algorithms and Complexity**, Athens, Greece.

2006   **ACAC - Athens Colloquium on Algorithms and Complexity**, Athens, Greece.

2006   **EuroCG - European Workshop on Computational Geometry**, Delphi, Greece.

Latest Update

August 18, 2019