

Danai Deligeorgaki

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EDUCATION

PhD in Combinatorics and its applications (WASP program): <i>KTH Royal Institute of Technology, Sweden</i> Supervisor: Liam Solus Cosupervisors: Katharina Jochemko, Johan Håstad	08/20-06/24 expected
MSc in Pure Mathematics (70.73, “Distinction”): <i>Imperial College London, England</i> MSc project in Algebraic Graph Theory with Martin Liebeck	09/18-10/19
BSc in Mathematics (8.83, “Excellent”): <i>Aristotle University of Thessaloniki (AUTH), Greece</i> BSc project in Algebraic Statistics with Hara Charalambous BSc Project in Formal Language Theory with George Rahonis	09/13-03/18

VISITING POSITIONS

Institute for Statistical and Mathematical Innovation (IMSI) USA: <i>Algebraic Statistics and Our Changing World - long program</i> (University of Chicago)	Fall 2023
San Francisco State University USA: <i>visiting Matthias Beck</i> (5-month research stint funded by WASP)	Fall 2023 Winter 2024
University of California, Berkeley USA: <i>visiting Andrés Vindas-Meléndez, with Daniel McGinnis, Hsin-Chieh Liao</i>	19-24/02/24

GRANTS & AWARDS

Scholarships:

<i>Onassis Scholar - Alexander S. Onassis Foundation</i> for MSc studies at Imperial College London	2018-2019
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Travel awards:

<i>Proposal selected for an Interdisciplinary Research Cluster at IMSI</i> Two weeks of support (travel, accommodation, meals) for the project <i>Correlated Equilibrium Polytopes of Zero-Sum Games</i> with Max Hill, Bryson Kagy and Stefana Sorea in 07/25	2024
<i>Graduate Research Workshop in Combinatorics</i> support for my visit at UC Berkeley	2024
<i>Royal Swedish Academy of Sciences - Magnuson Foundation</i> for IPAM workshop in 02/25 (UCLA)	2024
<i>Jubilee Foundation</i> for ECCO 2024	2024
for NORCOM 2023	2023
<i>Karl Engvers Foundation</i> for FPSAC 2023	2022

Conference funding:

<i>Graduate Student Meeting on Applied Algebra and Combinatorics</i> Foundation Compositio Mathematica Graduiertenkolleg MathCoRe Stockholm Math Centre	2023
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PREPRINTS

• Canon Permutation Posets

with M. Beck

arXiv:2410.03245 (submitted)

- **Colored Multiset Eulerian Polynomials**
with B. Han and L. Solus
arXiv:2407.12076 (submitted)
- **Combinatorics of generalized parking-function polytopes**
with M. M. Bayer, S. Borgwardt, T. Chambers, S. Daugherty, A. Dawkins, H.-C. Liao,
T. McAllister, A. Morrison, G. Nelson and A. R. Vindas-Meléndez
arXiv:2403.07387 (submitted)
- **Ehrhart Positivity of Panhandle Matroids and a Bound for Paving Matroids**
with D. McGinnis and A. R. Vindas-Meléndez
arXiv:2210.12271 (in preparation for submission)

PUBLICATIONS

- **Inequalities for f^* -vectors of Lattice Polytopes**
with M. Beck, M. Hlavacek and J. Valencia-Porrás
Advances in Geometry 24 (open access), 2024, arXiv:2210.12271
- **Extended abstract: Inequalities for f^* -vectors of Lattice Polytopes**
with M. Beck, M. Hlavacek and J. Valencia-Porrás
Séminaire lotharingien de combinatoire 89B (FPSAC), 2023
- **Combinatorial and Algebraic Perspectives on the Marginal Independence Structure of Bayesian Networks**
with A. Markham, P. Misra and L. Solus
Algebraic Statistics vol. 14 (2), 2023, arXiv:2210.00822
- **A Transformational Characterization of Unconditionally Equivalent Bayesian Networks**
with A. Markham, P. Misra and L. Solus
11th International Conference on Probabilistic Graphical Models (PGM), 2022, arXiv:2203.00521
- **Smallest Graphs with Given Automorphism Groups**
Journal of Algebraic Combinatorics (open access), 2022, arXiv:2108.10384

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TEACHING

Lecturer:

Discrete Mathematics, KTH (upcoming) 2024-2025

Teaching Assistant:

Discrete Mathematics, KTH 2023-2025

Differential Equations, KTH 2020-2022

Algebraic Structures II, AUTH (voluntary) 2016-2017

INSTITUTIONAL ACTIVITIES

Newsletter editor (10% occupation)

for the *School of Engineering Sciences* (SCI) at KTH 05/21-12/23

PhD representative (9% occupation)

for the *PhD in Pure Mathematics* program at KTH (elected) 01/21-01/22

(incl. participation in the school meetings and promotion committees, organizing social and educational events, handling sensitive cases of doctoral students and revising the PhD program)

ORGANIZATIONAL ACTIVITIES

Mini-symposium on Phylogenetic Networks (*co-organizer*):

SIAM Conference on Applied Algebraic Geometry, at U. of Wisconsin-Madison 07/25

Polytopes and Friends (*co-organizer*):

Three-day workshop (around 40 participants), at KTH 12/24

- 4th Graduate Student Meeting on Applied Algebra and Combinatorics** (*main co-organizer*):
 Three-day conference (around 70 participants), at KTH 04/23
- SCI School Science Communication workshops for PhDs** (*single organizer*):
 Two days of workshops bringing together SCI PhD students and experts from Artesc, a Dutch company specializing on applying skills from the arts to science communication, at KTH 11/21

REFEREE SERVICE (Experimental Mathematics, Computational Methods & Function Theory, Order)

CONFERENCE TALKS

- Trees4cat Workshop** (U. of Genoa, Italy):
Marginal Independence Structure of DAG Models 10/24
- Combinatorics and Geometry in Ioannina** (U. of Ioannina, Greece):
Distributional properties of colored multiset Eulerian polynomials 09/24
- VIII Encuentro Colombiano De Combinatoria ECCO** (U. del Cauca, Colombia):
Inequalities for f^ -vectors of lattice polytopes* (accepted talk) 06/24
- Graduate International School in Combinatorics GRADISCO** (U. di Pisa, Italy):
Inequalities for f^ -vectors of lattice polytopes* 06/24
- ASGARD Math 2024** (U. of Oslo, Norway):
Ehrhart positivity of panhandle matroids and a bound for paving matroids 05/24
- 5th Graduate Student Meeting in Applied Algebra and Combinatorics** (FU Berlin, Germany):
On the marginal independence structure of DAG models 04/24
- Séminaire Lotharingien de Combinatoire 91** (U. de Sevilla, Spain):
Distributional properties of colored multiset Eulerian polynomials 03/24
- Joint Mathematical Meetings JMM** (San Francisco, USA):
On the marginal independence structure of DAG models 01/24
- SIAM Conference on Applied Algebraic Geometry** (TU Eindhoven, Netherlands):
On the marginal independence structure of DAG models 07/23
- Geometry meets Combinatorics in Bielefeld** (Bielefeld U., Germany):
Inequalities for f^ -vectors of lattice polytopes* 09/22
- 28th Nordic Congress of Mathematicians NCM** (Aalto U., Finland):
Unconditional Equivalence for DAG models 08/22
- 2nd Conference for Greek Mathematicians** (National Technical U. of Athens, Greece):
Gorenstein decomposable models 07/22
- 14th Nordic Combinatorial Conference NORCOM** (The Arctic U. of Norway):
Unconditional Equivalence for DAG models 06/22
- Algebraic Statistics** (U. of Hawai'i at Manoa, USA):
Unconditional Equivalence for DAG models 05/22

SEMINAR TALKS

- Seminar on Nonlinear Algebra (**MPI MIS Leipzig**, Germany):
 Colored multiset permutations and algebraic statistics 12/24
- Applied CATS seminar (**KTH**, Sweden):
On the marginal independence structure of DAG models 10/24
- Graduate Online Combinatorics Colloquium (**GOCC**, USA):
Colored multiset Eulerian polynomials 05/24
- Combinatorics Seminar (**KTH**):
Colored multiset Eulerian polynomials 04/24
Canon permutation posets 11/24
- Combinatorics seminar (**UC Berkeley**, USA):
Colored multiset Eulerian polynomials 02/24
- Algebra and Discrete Mathematics seminar (**UC Davis**, USA):
Distributional properties of colored multiset Eulerian polynomials 02/24

Combinatorics and Geometry seminar (U. of Washington, USA): <i>Distributional properties of colored multiset Eulerian polynomials</i>	01/24
Algebra, Geometry, and Combinatorics Seminar (San Francisco State U., USA): <i>Combinatorics of colored multiset permutations</i>	11/23
Discrete Geometry graduate student seminar (FU Berlin, Germany): <i>The geometry of discrete decomposable models</i>	07/22

WORKSHOPS

<i>Recent Perspectives on Non-crossing Partitions through Algebra, Combinatorics, and Probability</i> (ESI Institute, U. of Vienna, Austria)	02/25
<i>Comp. Interactions between Algebra, Combinatorics, and Disc. Geometry</i> (IPAM UCLA, USA)	02/25
<i>Numerical (Nonlinear) Algebra in the Real World</i> (MPI CBG, Germany)	02/25
<i>Geometry without Geometry</i> (Goethe U. Frankfurt, Germany)	12/24
<i>Women in Algebraic Statistics</i> (U. of Oxford, St John's College, England)	07/24
<i>Computations and Data in Algebraic Statistics</i> (BIRS - Casa Matemática Oaxaca, Mexico)	05/23
<i>Graduate Research Workshop in Combinatorics</i> (GRWC - U. of Wyoming, USA)	07-08/23
<i>Research Encounters in Algebraic and Combinatorial Topics</i> (REACT - online)	02-03/21

POSTER PRESENTATIONS

VIII Encuentro Colombiano De Combinatoria ECCO (U. del Cauca, Colombia): <i>Ehrhart positivity of panhandle matroids and a bound for paving matroids</i>	06/24
AlCoVE: an Algebraic Combinatorics Virtual Expedition (online): <i>Ehrhart positivity of panhandle matroids and a bound for paving matroids</i>	06/24
<i>Inequalities for f^*-vectors of lattice polytopes</i>	06/23
Formal Power Series and Algebraic Combinatorics FPSAC (UC Davis, USA): <i>Inequalities for f^*-vectors of lattice polytopes</i>	07/23
WASP-Helsinki network (Aalto U., Finland): <i>Unconditional Equivalence in Causal Discovery</i>	11/22
CIMPA summer school: Mathematical Methods in Data Analysis (U. of Tirana, Albania): <i>Gorenstein decomposable models</i>	07/22
Combinatorial, Computational, and Applied Algebraic Geometry - B. Sturmfels' 60 th birthday (U. of Washington, USA): <i>Gorenstein decomposable models</i>	06/22

OTHER SELECTED EVENTS

Enumerative and Algebraic Combinatorics - B. Sagan's 70 th birthday (U. of Florida, USA)	02/24
89 th Séminaire Lotharingien de Combinatoire - Brenti Fest (Bertinoro, Italy)	03/23
11 th Probabilistic Graphical Models - PGM 2022 (U. de Almeria, Spain)	10/22
VII Encuentro Colombiano de Combinatoria - ECCO 2022 (U. de los Andes/Javeriana, Colombia)	06/22
AI Day 2022 (Aalto U., Finland)	11/22

SKILLS & INTERESTS

Languages: Greek (native), English (proficient), Spanish (conversational)
Programming: Python (basic), Macaulay2, GAP, R (familiar)
Hobbies: Judo, Innebandi, Volleyball, Improv Theater, Salsa dancing, Climbing