Theo Douvropoulos

Work Address
Lederle Graduate Research Tower, Office 1118
University of Massachusetts, Amherst
Amherst, MA 01003-9305, USA

Permanent Address
80 Damon Road, Apt. 4308
Northampton, MA 01060, USA
(001) 413-539-4141
tdouvropoulo@umass.edu

Education

Doctor of Philosophy, Mathematics
University of Minnesota, Twin Cities   Sept. 2012 - Sept. 2017
Advisor: Victor Reiner
including *Master of Science*, Mathematics   July 2015

Bachelor of Arts, Mathematics
National and Kapodistrian University of Athens, Greece   Sept. 2005 - Sept. 2010
(followed by mandatory army service)

Professional experience

University of Massachusetts, Amherst   Sept. 2020 - present
Marshall H. Stone Visiting Assistant Professor

Institut de Recherche en Informatique Fondamentale (IRIF), CNRS   Oct. 2017 - Aug. 2020
Postdoctoral researcher. (Université Paris Diderot - Paris 7)

Research Interests

Algebraic Combinatorics with a focus on (complex) reflection groups, their geometry and representation theory, and interactions with group theory, Hurwitz numbers, and Frobenius manifolds.

Publications and preprints (ordered by first eprint appearance)

2022+ (with M. Josuat-Vergès) "Recursions and Proofs in Cataland", FPSAC extended abstract available online at `https://people.math.umass.edu/~douvropoulos/FPSAC-2023.pdf`, 12p

2022 (with M. Josuat-Vergès) "The generalized cluster complex: refined enumeration of faces and related parking spaces", arXiv: 2209.12540 (submitted), 42p

—— "Counting nearest faraway flats for Coxeter chambers", arXiv: 2209.06201 (submitted), 16p

—— (with J. B Lewis) "In which it is proven that, for each parabolic quasi-Coxeter element in a finite real reflection group, the orbits of the Hurwitz action on its reflection factorizations are distinguished by the two obvious invariants", arXiv: 2209.00774 (submitted), 10p

—— (with J. B Lewis and A. Morales) "Hurwitz numbers for reflection groups II: Parabolic quasi-Coxeter elements", arXiv: 2209.00066 (submitted), 50p

2021 (with J. B Lewis and A. Morales) "Hurwitz numbers for reflection groups I: Generatingfunctionology", In: *Enumer. Comb. Appl. 2.3 (2022)*, Paper No. S2R20, 21p

—— (with G. Chapuy) "Counting chains in the noncrossing partition lattice via the W-Laplacian", In: *J. Algebra 602 (2022)*, pp. 381–404.

2020 (with G. Chapuy) "Coxeter factorizations with generalized Jucys-Murphy weights and Matrix Tree theorems for reflection groups", In: *Proceedings of the London Mathematical Society (2022)*, DOI: 10.1112/plms.12490, 63p

2018 "On enumerating factorizations in reflection groups", In: *To appear in Algebraic Combinatorics (2022)*, arXiv: 1811.06566, 28p

—— "Cyclic sieving for reduced reflection factorizations of the Coxeter element", In: Sem. Lothar. Combin. 80B, Art. 86, 12p

—— "Lyashko-Looijenga morphisms and primitive factorizations of the Coxeter element", *Revisions submitted for Mathematische Annalen*, arXiv: 1808.10395, 28p

2017 "Applications of Geometric Techniques in Coxeter-Catalan Combinatorics", Thesis (Ph.D.) University of Minnesota, ProQuest LLC, Ann Arbor, MI, 2017, 106p

—— (with J. Jelisiejew, B. Nødland, and Z. Teitler) "The Hilbert scheme of 11 points in $\mathbb{A}^3$ is irreducible", In: *Combinatorial Algebraic Geometry*, Vol.80, Fields Inst. Comm., 2017, 32p

Refereed Lectures

2021 "Hurwitz numbers for reflection groups", FPSAC Tel-Aviv.

2019 "On enumerating factorizations in reflection groups", FPSAC Ljubljana.

2018 "Cyclic sieving for reduced reflection factorizations of the Coxeter element", FPSAC Hanover.

Conference Lectures

2022 "Parking spaces in Coxeter-Catalan combinatorics", *Pacific Rim Mathematical Association (PRIMA) Congress*, Vancouver, Canada.

—— "Hurwitz numbers via transportation polytopes", *ECCO: VII Encuentro Colombiano de Combinatoria*, Bogota, Colombia.

2021 "Volumes of root zonotopes via the W-Laplacian", *(Polytop)ics: Recent advances on polytopes*, (virtual due to the COVID19 pandemic), organized by MPI, Germany.

2019 "Coxeter factorizations and the Matrix Tree theorem with generalized Jucys-Murphy weights", *Flags, galleries and reflection groups"*, Sydney, Australia.

—— "Quasi-Coxeter elements and Frobenius manifolds", *Island V: Integrable systems, special functions and combinatorics*, Isle of Skye, Scotland.

2018 "Enumeration of reflection factorizations of a Coxeter element", *Einstein workshop on Algebraic Combinatorics*, Berlin, Germany.

2017 "Perhaps the best way to count: Using complex analytic geometry and Riemann's existence theorem", *Mathematical Analysis in Athens - Katavolos and Nestoridis*, Greece.

2016 "Lyashko-Looijenga morphisms and primitive factorizations of a Coxeter element", *Conference on Group Actions and Algebraic Combinatorics*, Herstmonceaux Castle, England.

Service

Conference "Various Guises of Reflection Arrangements", Edinburgh, co-organizer   2023
(including winning a £20,500 grant by ICMS)

AMS 2022 Fall Eastern Sectional Meeting, Amherst, special session co-organizer   2022

UMass Discrete Math Seminar, co-organizer   2020-2023

UMass committees, member of a PHD candidacy exam and a senior thesis committee   2020-2023

Referee for a variety of journals including: Canadian Journal of Mathematics (CJM), Combinatorial Theory (CT), Algebraic Combinatorics (ALCO), Journal of the London Mathematical Society (JLMS), Journal of Algebra

Teaching experience

As lecturer at Smith College   2022

- Graph Theory (MTH 255)   Spring 2022

As lecturer at the University of Massachusetts, Amherst   2020 - present

- Intro to Discrete Structures (Math 455; scheduled)   Spring 2023
- Intro to Linear Algebra (Math 235; scheduled)   Spring 2023
- Honors Intro to Linear Algebra (Math 235H)   Fall 2022
- Ordinary Differential Equations (Math 331)   Spring 2022
- Intro to Abstract Algebra (Math 411)   Fall 2021
- Intro to Linear Algebra (Math 235)   Fall 2021
- Multivariate Calculus (Math 233, online lectures)   Spring 2021
- Multivariate Calculus (Math 233, online lectures)   Fall 2020

As lecturer at the University of Minnesota   2015

- Applied Linear Algebra   Summer 2015

As teaching assistant at the University of Minnesota   2012 - 2017
- Precalculus II   Spring 2017
- Honors Mathematics II   Spring 2016
- Honors Mathematics I   Fall 2015
- Sequences, Series, and Foundations (writing intensive)   Fall 2014
- Linear Algebra and Differential Equations   Spring 2014
- Multivariable Calculus   Fall 2013
- Calculus II   Spring 2013
- Calculus I   Fall 2012

As teaching assistant at NKUA, Athens, Greece
Complex Analysis   Spring 2012

As mentor or private tutor
- For the UMass Summer REU   2021
  (my student accepted a Math PhD offer from USC)
- Private tutoring of a high school student as preparation for the IMO   2006 - 2010
  (my student won bronze and silver medals in 2009,2010)

A selection of seminar talks
- "Recursions and proofs in Coxeter-Catalan combinatorics"

  2022 Dec.   Ruhr-Universität Bochum, Obersminar "Kombinatorik", Germany.

  2022 Nov.   University of Vermont, Combinatorics seminar, Burlington.

  2022 Nov.   UQAM, LACIM seminar, Montreal.

  2022 Nov.   Algebraic and Enumerative Combinatorics Seminar, Waterloo (virtual).

- "Counting chains in the noncrossing partition lattice via the W-Laplacian"

  2021 Dec.   The CAGE (Combinatorics, Algebra, and Geometry) Seminar, Drexel & UPenn.

  2021 Oct.   Algebra, Combinatorics, and Number Theory seminar, DePaul, Chicago.

- "Hurwitz numbers for reflection groups"

  2021 Oct.   Brandeis Combinatorics Seminar, Boston (virtual).

- "Coxeter factorizations and the Matrix Tree theorem with generalized Jucys-Murphy weights"

  2021 Apr.   Combinatoire Enumerative et Algebrique, LABRI, Bordeaux (virtual).

  2020 Feb.   Algebra seminar, Institut Denis Poisson, Tours, France.

- "On enumerating factorizations in reflection groups"

  2018 Nov.   TU Kaiserslautern, Groups and Representations seminar, Germany.

  2018 Aug.   University of Minnesota, Combinatorics seminar.

- "Cyclic sieving for reduced reflection factorizations of the Coxeter element"

  2018 Jun.   Laboratoire d'informatique de l'Ecole polytechnique (LIX), Palaiseau, France.

- "Applications of geometric techniques in Coxeter-Catalan combinatorics"

  2018 Feb.   Laboratoire Amiénois de Mathématique Fondamentale et Appliquée, Amiens.

  2018 Jan.   Institut de Recherche Mathématique Avancée, Strasbourg.

- "Lyashko-Looijenga morphisms and primitive factorizations of the Coxeter element"

  2017 Jun.   MIT, Combinatorics seminar.

  2017 Feb.   University of Minnesota, Combinatorics seminar.

  2017 Jan.   Discrete Geometry group, Freie Universität Berlin.

Honors

Finalist for the 2022-2023 Distinguished Teaching Award at UMass Amherst (results in Spring '23)

Bronze medal at the International Mathematical Olympiad, IMO 2005, Mexico.