

Theodore Molla

Curriculum Vitae

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Research Interests: Graph Theory, Hypergraphs, Extremal Graph Theory,
Probabilistic Methods, Computational Complexity

Affiliation: *August 2017-to date* University of South Florida – Assistant Professor

Postdoc: *August 2013-August 2017* University of Illinois at Urbana-Champaign – J. L. Doob postdoc

PhD: *August 2013* Arizona State University
Advisors: A. Czygrinow and H.A Kierstead
Title: *Tiling Directed Graphs with Cycles and Tournaments*

Current Grant: *8/2018 thru 7/2022*, NSF Grant \$113,703
Title: *Factors in Graphs and Related Combinatorial Structures*

Publications

Published or Accepted

- (1) *On even rainbow or nontriangular directed cycles* (Accepted by Journal of Combinatorics) (with A. Czygrinow, B. Nagle, and R. Oursler) <https://arxiv.org/abs/1912.02049>
- (2) *On odd rainbow cycles in edge-colored graphs* European Journal of Combinatorics (May 2021) (with A. Czygrinow, B. Nagle, and R. Oursler) <https://doi.org/10.1016/j.ejc.2021.103316>
- (3) *Transitive tournament tilings in oriented graphs with large minimum total degree* SIAM Journal on Discrete Mathematics (2021 35(1)) 250–266 (with L. DeBiasio, A. Lo, and A. Treglown) <https://doi.org/10.1137/19M1269257>
- (4) *Disjoint cycles and chorded cycles in a graph with given minimum degree* Discrete Mathematics (June 2020) (with M. Santana and E. Yeager) <https://doi.org/10.1016/j.disc.2020.111837>
- (5) *Cyclic triangle factors in regular tournaments* The Electronic Journal of Combinatorics (2019) P4.24. (with L. Li) <http://www.combinatorics.org/ojs/index.php/eljc/article/view/v26i4p24>
- (6) *Long rainbow cycles and Hamiltonian cycles using many colors in properly edge-colored complete graphs* European Journal of Combinatorics (June 2019) 140–151 (with J. Balogh) <https://doi.org/10.1016/j.ejc.2019.02.008>
- (7) *An algorithmic answer to the Ore-type version of Dirac’s question on disjoint cycles* Optimization Problems in Graph Theory (2018) (book chapter) (with H.A. Kierstead, A. Kostochka and D. Yager) <https://doi.org/10.1007/978-3-319-94830-0>

- (8) *Tiling directed graphs with tournaments* Forum of Mathematics, Sigma, 6 (2018), e2 (with A. Czygrinow, L. DeBiasio and A. Treglown) <https://doi.org/10.1017/fms.2018.2>
- (9) *Triangle-tilings in graphs without large independent sets*, Combinatorics, Probability and Computing (July 2018) 449–474 (with J. Balogh, A. McDowell and R. Mycroft) <https://doi.org/10.1017/S0963548318000196>
- (10) *Spanning trees with leaf distance at least d* , Discrete Math (June 2017) 1412–1418 (with C. Erbes, S. Mousley, and M. Santana). <https://doi.org/10.1016/j.disc.2016.09.027>
- (11) *Transitive triangle-tilings in oriented graphs*, Journal of Combinatorial Theory, Series B (May 2017) 64–87 (with J. Balogh and A. Lo). <https://doi.org/10.1016/j.jctb.2016.12.004>
- (12) *A refinement of theorems on vertex disjoint chorded cycles*, Graphs and Combinatorics (January 2017) 181–201 (with M. Santana and E. Yeager). <https://doi.org/10.1007/s00373-016-1749-0>
- (13) *Sharpening an Ore-type version of the Corrádi-Hajnal theorem*, Abhandlungen aus dem Mathematischen Seminar der Universität Hamburg (October 2017) 299–335 (with H.A. Kierstead, A. Kostochka, and E. Yeager). <https://doi.org/10.1007/s12188-016-0168-8>
- (14) *Triangle factors of graphs without large independent sets and of weighted graphs*, Random Structures & Algorithms (December 2016) 669–693 (with J. Balogh and M. Sharifzadeh and Appendix by C. Reiher and M. Schacht). <https://doi.org/10.1002/rsa.20670>
- (15) *Increasing paths in edge-ordered graphs: the hypercube and random graphs*, The Electronic Journal of Combinatorics (2016) P2.15. (with J. De Silva, F. Pfender, T. Retter and M. Tait) <http://www.combinatorics.org/ojs/index.php/eljc/article/view/v23i2p15>
- (16) *The semi-degree threshold for anti-directed Hamilton cycles*, The Electronic Journal of Combinatorics (2015) P4.34. (with L. DeBiasio) <http://www.combinatorics.org/ojs/index.php/eljc/article/view/v22i4p34>
- (17) *Arbitrary orientations of Hamilton cycles in digraphs*, SIAM J. Discrete Math. (2015), 29–3, 1553–1584. (with L. DeBiasio, D. Kühn, D. Osthus and A. Taylor) <https://doi.org/10.1137/140974675>
- (18) *An extension of the Hajnal-Szemerédi theorem to directed graphs*, Combinatorics, Probability and Computing. (September 2015) 754–773. (with A. Czygrinow, L. DeBiasio and H.A. Kierstead) <https://doi.org/10.1017/S0963548314000716>
- (19) *On directed versions of the Corrádi-Hajnal corollary*, European Journal of Combinatorics (November 2014) 1–14. (with A. Czygrinow and H.A. Kierstead) <https://doi.org/10.1016/j.ejc.2014.05.006>
- (20) *Tight co-degree condition for the existence of loose Hamilton cycles in 3-graphs*, SIAM J. Discrete Math. (2014), 28-1, 67–76. (with A. Czygrinow) <https://doi.org/10.1137/120890417>
- (21) *A note on relaxed equitable coloring of graphs*, Information Processing Letters (November 2011) 1062–1066. (with H. Fan, H.A. Kierstead, G. Liu, J. Wu and X. Zhang) <https://doi.org/10.1016/j.ipl.2011.08.001>

Papers (Submitted)

- (1) *Transversal C_k -factors in subgraph of the balanced blow-up of C_k* (with B. Ergemlidze)
- (2) *Disjoint cycles in graphs with bounded independence number* (with M. Santana)
- (3) *Powers of Hamiltonian Cycles in Multipartite Graphs* (with L. DeBiasio and R. Martin)

Talks

Invited Talks

- *Disjoint cycles in graphs with restricted independence number*, SIAM Conference on Discrete Mathematics 2021, Minisymposium on Graph Theory and Combinatorics, July 21, 2021
- *Disjoint cycles in graphs with restricted independence number*, AMS Fall Southeastern Sectional Meeting, Special Session on Advanced Topics in Graph Theory and Combinatorics, Mar 13, 2021
- *Transversal C_k -factors in subgraphs of the balanced blowup of C_k* , Georgia Tech Graph Theory Seminar, Nov 17, 2020
- *Transversal C_k -factors in subgraphs of the balanced blowup of C_k* , AMS Fall Southeastern Sectional Meeting, Special Session on Structural and Extremal Graph Theory, Oct 11, 2020
- *Transversal C_k -factors in subgraphs of the balanced blowup of C_k* , University of Illinois Graph Theory and Combinatorics seminar, May 19, 2020
- *Powers of Hamiltonian cycles in multipartite graphs*, Iowa State Discrete Math Seminar, October 21, 2019
- *Transitive tournament tilings in oriented graph with large total degree*, AMS Fall Midwestern Sectional Meeting, Special Session on Extremal Graph Theory, September 14, 2019
- *Transitive tournament tilings in oriented graph with large total degree*, AMS Spring Western Sectional Meeting, Special Session on Structural Graph Theory, March 23, 2019
- *Rainbow cycles in edge-colored graphs with large minimum color degree*, AMS Spring Southeastern Sectional Meeting, Special Session on Recent Development in Graph Theory, March 16, 2019
- *Rainbow cycles in edge-colored graphs with large minimum color degree*, 4th Annual Mostly Manitoba, Michigan and Minnesota Combinatorics Graduate Students Workshop, September 9, 2018.
- *Vertex-disjoint cycles in graphs and directed graphs*, Atlanta Lecture Series, April 21, 2018.
- *An overview of extremal graph theory*, University of Tampa, October 25, 2017
- *Triangle-factors in regular tournaments*, AMS Fall Southeastern Sectional Meeting, Special Session on Structural Graph Theory, September 23, 2017
- *Triangle-tilings in graphs without large independent sets*, AMS Fall Central Sectional Meeting, Special Session on Probabilistic and Extremal Combinatorics, October 30, 2016
- *Ladders in dense graphs*, AMS Fall Eastern Sectional Meeting, Special Session on New Developments in Graphs and Hypergraphs, September 24, 2016
- *Perfect triangle-tilings*, EXCILL 3: External Combinatorics at Illinois, August 10, 2016
- *Tiling directed graph with tournaments*, SIAM Conference on Discrete Math, Minisymposium on Graph Theory, June 9, 2016
- *Tiling directed graph with tournaments*, AMS Spring Central Sectional Meeting, Special Session on Probabilistic and Extremal Combinatorics, April 16, 2016.
- *Factors in graphs, directed graphs and weighted graphs*, Iowa State University, Discrete Math Seminar, March 22, 2016.
- *Factors in graphs, directed graphs and weighted graphs*, University of Illinois Mathematics Colloquium, December 9, 2015.
- *Factors in graphs, directed graphs and weighted graphs*, Atlanta Lecture Series, November 14, 2015.
- *Factors in graphs, directed graphs and weighted graphs*, Illinois State University Discrete Math Seminar, November 5, 2015.
- *Arbitrary orientations of Hamilton cycles in digraphs*, AMS Spring Central Sectional Meeting, Special Session on Extremal Graph Theory: Hypergraphs, Directed Graphs, and Other Generalizations, March 15, 2015

- *The Absorbing method*, 2nd Lake Michigan Workshop on Combinatorics and Graph Theory, March 8, 2015
- *Factors in graphs, directed graphs and hypergraphs*, Western Michigan University Mathematics Colloquium, February 26, 2015
- *Hajnal-Szemerédi type theorems*, Atlanta Lecture Series, Emory University, November 1, 2014
- *Equitable coloring and H-factors of graphs*, Miami University Mathematics Colloquium, October 23, 2014
- *Minimum degree thresholds for spanning subgraphs of directed and oriented graphs*, Joint Mathematical Meetings, AMS Special Session on Graph Theory: Structural and Extremal Problems, January 15, 2014
- *Tight co-degree condition for the existence of loose Hamilton cycles in 3-uniform hypergraphs*, AMS Fall Southeastern Sectional Meeting, Special Session on Extremal Graph Theory, October 6, 2013
- *The semi-degree threshold for anti-directed Hamilton cycles*, AMS Spring Western Sectional Meeting, Special Session on Extremal Graph Theory, April 13, 2013
- *Extending the Hajnal-Szemerédi Theorem to directed graphs*, University of Illinois Combinatorics and Graph Theory Seminar, November 6, 2012
- *Cyclic and transitive triangle factors of directed graphs*, Miami University Graph Theory Seminar, June 6, 2012

Contributed Talks

- *Transitive tournament tilings in oriented graph with large total degree*, The 19th International Conference on Random Structure and Algorithms, July 16, 2019
- *Cyclic triangle factors in regular tournaments*. 2018 SIAM Conference on Discrete Math June 4, 2018
- *Triangle factors in graphs without large independent sets*. 30th Midwest Conference on Combinatorics, Cryptography, and Computing, October 16, 2016
- *Triangle factors in graphs, directed graphs and weighted graphs* LMS–EMS Mathematical Meeting, University of Birmingham, September 20, 2015
- *Triangle factors in graphs with large minimum degree and no large independent sets* The 17th International Conference on Random Structures and Algorithms, July 30, 2015
- *Perfect transitive triangle tilings in oriented graphs*, The 27th Cumberland Conference on Combinatorics, Graph Theory and Computing, May 16, 2014
- *Perfect tilings in graphs and digraphs*, Joint Mathematics Meetings, AMS Session on Graph Theory I, January 11, 2013
- *Hajnal Szemerédi and directed graphs*, 26th Midwest Conference on Combinatorics, Cryptography, and Computing, October 11, 2012
- *Oriented 2-factors in directed graphs*, MIDwestern Graph TheorY (MIGHTY) LIII Conference, September 22, 2012

Teaching

University of South Florida

- (Graduate course) Combinatorics II - Spring 2020
- (Graduate course) Combinatorics I - Fall 2019
- Optimization - Fall 2020
- Introduction to Graph Theory - Spring 2018, Spring 2019, Spring 2020
- Introduction to Combinatorics - Fall 2017, Fall 2018, Fall 2019, Fall 2020, Fall 2021
- Bridge to Abstract Mathematics - Fall 2021
- Calculus II - Fall 2018

University of Illinois at Urbana-Champaign

- (Graduate course) Optimization in Networks - Spring 2015
- Linear Programming - Fall 2016, Spring 2016, Fall 2015, Spring 2015, Spring 2014
- Non-linear Programming - Fall 2014, Spring 2017
- Graph Theory - Spring 2016, Spring 2014
- Preparation for Calculus - Fall 2013

Arizona State University

- (Graduate course) Graph Theory (Assistant) - Spring 2013
- (Graduate course) Applied Analysis (Assistant) - Fall 2012
- (Graduate course) Enumerative Combinatorics (Assistant) - Fall 2011, Fall 2010
- Calculus for Engineers II - Summer 2011
- Calculus for Engineers I - Spring 2010
- Calculus with Analytic Geometry II (Recitation) - (3 semesters)

Grants

- NSF Grant “Factors in Graphs and Related Combinatorial Structures”, \$113,703, awarded as PI, 8/2018 – 7/2022
- NSF Grant “Spare Discrete Structures”, \$300,000, 6/2015 – 7/2018 awarded as a co-PI with PI József Balogh and fellow co-PI Jozef Skokan

Service

- Refereed papers for Journal of Graph Theory, The Electronic Journal of Combinatorics, Proceeding of the London Mathematical Society, Discrete Mathematics, SIAM Journal of Discrete Math, Information Processing Letters, European Journal of Combinatorics, International Journal of Discrete Mathematics, Utilitas Mathematica, and Journal of Combinatorial Optimization
- Served on multiple NSF grant panels
- Co-organizer (with B. Nagle) of the AMS Southeastern Fall Sectional Meeting Special Session “Recent Trends in Extremal Graph Theory”, Nov 2–3, 2019
- Co-organizer (with A. Bahmanian) of the AMS Special Session “Connections in Discrete Mathematics: Graphs, Hypergraphs, and Designs at the 2018 Joint Mathematics Meetings”, Jan 13, 2018
- Co-organizer (with A. Bahmanian) of AMS Central Spring Sectional Meeting Special Session “Extremal Problems in Graphs, Hypergraphs and Other Combinatorial Structures”, April 1–2, 2017

- Co-organizer (with L. DeBiasio) of AMS Central Spring Sectional Meeting Special Session “Extremal Graph Theory: Hypergraphs, Directed graphs, and Other Generalization”, March 14–15, 2015
- Co-organizer of the Graph Theory and Combinatorics Seminar at UIUC - Fall 2014–Spring 2017
- ASU math circle instructor
 - Recurrence Relations and Sorting Networks, February 22 & 29, 2012
 - Polyominoes, November 28, 2012
 - Hat Guessing Games and Hamming Codes, March 25, 2013

Additional degrees

University	Location	Degree	Date
Arizona State University	Tempe, AZ	MS in Computer Science	05/2004
University of Michigan	Ann Arbor, MI	BS in Computer Science	12/1995

Employment prior to PhD

Employer	Location	Position	Dates
eBay Inc (PayPal)	Scottsdale, AZ	Programmer	04/2006 to 11/2007
General Dynamics / Motorola	Scottsdale, AZ	Programmer	02/1996 to 03/2006