Andrew Suk

Contact Information

University of California at San Diego
Department of Mathematics
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Research Interests

Discrete geometry, extremal combinatorics, Ramsey theory, graph theory, and combinatorial number theory.

Employment

University of California at San Diego

Associate Professor, *2019–present.*

Assistant Professor, *2017–2019.*

University of Illinois at Chicago

Assistant Professor, *2014–2017.*

Massachusetts Institute of Technology

Applied Mathematics Instructor, *2012–2014.*

NSF Postdoctoral Fellow *2011–2014.*

École Polytechnique Fédérale de Lausanne

Postdoctoral Fellow, *2011.*

Long-Term Visiting Scientist, *2010–2011.*

Education

Courant Institute of Mathematical Sciences, New York University

Ph.D., Mathematics, *2005–2011.*

- Advisor: János Pach.

University of Illinois at Urbana-Champaign

M.A. in Electrical Engineering, *2003.*

B.A. in Electrical Engineering, *2001.*

Awards and Grants

2020–2023	NSF FRG grant (Co-PI with J. Verstraëte, $621,554)
2017–2023	NSF CAREER award DMS-1800746 (PI, $473,824). *CAREER: Ramsey Theory and Discrete Geometry.*
2017–2022	Alfred Sloan Research Fellowship ($60,000).
2015–2018	NSF Research Grant DMS-1500153 (PI, $179,513). *Geometric Ramsey Theory and Incidence Geometry.*
2015	UIC Junior Faculty Travel Award ($1000).
2014	UIC Junior Faculty Travel Award ($1000).
2011–2014	NSF Postdoctoral Research Fellowship Massachusetts Institute of Technology.
2009–2010	Dean's Dissertation Fellowship New York University Graduate School of Arts and Sciences.
2006–2009	Henry MacCracken Fellowship New York University Graduate School of Arts and Sciences.

PREPRINTS

A. Suk, J. Zeng, Unavoidable patterns in complete simple topological graphs, submitted.

J. Fox, J. Pach, A. Suk, Quasiplanar graphs, string graphs, and the Erdos-Gallai problem, submitted.

M. Mirzaei, A. Suk, J. Verstraëte, Constructions of point-line arrangements in the plane with large girth, submitted.

JOURNAL PUBLICATIONS

J. Fox, J. Pach, A. Suk, Sunflowers in set systems of bounded VC-dimension, to appear in *Combinatorica*.

S. Leuchtner, C.M. Nicolas, A. Suk, A note on visible islands, to appear in *Studia Sci. Math. Hungar.*

D. Mubayi, A. Suk, E. Zhu, A note on the Erdos-Hajnal hypergraph Ramsey problem, to appear in *Proc. Amer. Math. Soc.*.

D. Mubayi, A. Suk, Cliques with many colors in triple systems, *Journal of Combinatorics* **12** (2021), 563–569.

J. Fox, J. Pach, A. Suk, Bounded VC-dimension implies the Schur-Erdos conjecture, *Combinatorica* **41** (2021), 803–813.

A. Suk, I. Tomon, Hasse diagrams with large chromatic number, *Bull. Lond. Math. Soc.* **53** (2021), 747–758.

M. Mirzaei, A. Suk, On grids in point-line arrangements in the plane, to appear in *Discrete Comput. Geom.* **65** (2021), 1232–1243.

J. Fox, J. Pach, A. Suk, Semi-algebraic colorings of complete graphs, *Israel J. Math.* **239** (2020), 39–57.

D. Mubayi, A. Suk, A survey of hypergraph Ramsey problems, *Discrete Mathematics and Applications*, Springer Optimization and Its Applications **165**, edited by A. Raigorodskii and M. T. Rassias.

T. Pham, A. Suk, On the structure of distance sets over prime fields, *Proc. Amer. Math. Soc* **148** (2020), 3209-3215.

D. Mubayi, A. Suk, The Erdős-Hajnal hypergraph Ramsey problem, *J. Eur. Math. Soc. (JEMS)* **22** (2020), 1247–1259.

M. Mirzaei, A. Suk, A positive fraction mutually avoiding sets theorem, *Discrete Math.* **343** (2020), 111730.

J. Fox, J. Pach, A. Suk, Approximating the rectilinear crossing number, *Comput. Geom.* **81** (2019), 45–53.

J. Fox, J. Pach, A. Suk, Erdos-Hajnal conjecture for graphs with bounded VC-dimension, *Discrete Comput. Geom.* **61** (2019), 809–829.

D. Mubayi, A. Suk, The Erdős-Szekeres problem and an induced Ramsey question, *Mathematika* **65** (2019), 702–707.

J. Fox, J. Pach, A. Suk, Ramsey-Turán numbers for semi-algebraic graphs, *Electron. J. Combin* **25** (2018), #P4.61.

J. Fox, J. Pach, A. Suk, A note on the clique chromatic number of geometric graphs, to appear in *Geombinatorics*.

J. Fox, J. Pach, A. Suk, Erdos-Hajnal conjecture for graphs with bounded VC-dimension, to appear in *Discrete and Computational Geometry, SoCG 2017 Special Issue*.

D. Mubayi, A. Suk, Constructions in Ramsey theory, *J. Lond. Math. Soc.* **97** (2018), 247–257.

J. Fox, J. Pach, A. Suk, More distinct distances under local conditions, *Combinatorica* **38** (2018), 501–509.

D. Mubayi, A. Suk, New lower bounds for hypergraph Ramsey numbers, *Bull. Lond. Math. Soc.* **50** (2018), 189–201.

A. Suk, On the Erdos-Szekeres convex polygon problem, *J. Amer. Math. Soc.* **30** (2017), 1047–1053.

D. Mubayi, A. Suk, Off-diagonal hypergraph Ramsey numbers, *J. Combin. Theory Ser. B* **125** (2017), 168–177.

J. Fox, J. Pach, A. Sheffer, A. Suk, J. Zahl, A semi-algebraic version of Zarankiewicz's problem, *J. Eur. Math. Soc. (JEMS)* **19** (2017), 1785–1810.

J. Fox, J. Pach, A. Suk, A polynomial regularity lemma for semi-algebraic hypergraphs and its applications in geometry and property testing, *SIAM J. Comput.* **45** (2016), 2199–2223.

A. Suk, Semi-algebraic Ramsey numbers, *J. Combin. Theory Ser. B* **116** (2016), 465–483.

A. Ruiz-Vargas, A. Suk, C. Toth, Disjoint edges in topological graphs and the tangled-thrackle conjecture, *European J. Combin.* **51** (2016), 398–406.

A. Suk, B. Walczak, New bounds on the maximum number of edges in k-quasi-planar graphs, *Comput. Geom.* **50** (2015), 24-33.

L. Guth, A. Suk, The joints problem for matroids, *J. Combin. Theory Ser. A* **131** (2015), 71–87.

A. Suk, Coloring intersection graphs of x-monotone curves in the plane, *Combinatorica* **34** (2014), 487–505.

A. Suk, A note on order-type homogeneous point sets, *Mathematika* **60** (2014), 37–42.

D. Mubayi, A. Suk, A Ramsey-type result for geometric ℓ-hypergraphs, *European J. Combin.* **41** (2014), 232–241.

D. Conlon, J. Fox, J. Pach, B. Sudakov, A. Suk, Ramsey-type results for semi-algebraic relations, *Trans. Amer. Math. Soc.* **366** (2014), 5043–5065.

E. Ackerman, J. Fox, J. Pach, A. Suk, On grids in topological graphs, *Comput. Geom.* **47** (2014), 710–743.

A. Suk, Density theorems for intersection graphs of t-monotone curves, *SIAM J. Discrete Math.* **27** (2013), 1323–1334.

J. Fox, J. Pach, A. Suk, The number of edges in k-quasi-planar graphs, *SIAM J. Discrete Math.* **27** (2013), 550–561.

A. Suk, Disjoint edges in complete topological graphs, *Discrete Comput. Geom.* **49** (2013), 280–286.

J. Fox, J. Pach, B. Sudakov, A. Suk, Erdős-Szekeres-type theorems for monotone paths and convex bodies, *Proc. Lond. Math. Soc.* **105** (2012), 953–982.

A. Suk, A note on geometric 3-hypergraphs, *Thirty Essays on Geometric Graph Theory*, ed. J. Pach, Algorithms and Combinatorics **29** (2012), Springer, 489–498.

R. Fulek, A. Suk, On disjoint crossing-families in geometric graphs, *Thirty Essays on Geometric Graph Theory*, ed. J. Pach, Algorithms and Combinatorics **29** (2012) Springer, 289–302.

J. Pach, A. Suk, M. Treml, Tangencies between families of disjoint regions in the plane, *Comput. Geom.* **45** (2012), 131–138.

A. Hubard, L. Montejano, E. Mora, A. Suk, Order types of convex bodies, *Order* **28** (2011), 121–130.

A. Suk, On the order type of system of segments in the plane, *Order* **27** (2010), 63–68.

A. Asinowski, A. Suk, Edge intersection graphs of a system of paths in a grid, *Discrete Appl. Math.* **157** (2009), 3174–3180.

A. Suk, A note on $K_{k,k}$-cross free families, *Electron. J. Combin.* **15** (2008), #N39.

Conference Proceedings

A. Suk, J. Zeng, A positive fraction Erdos-Szekeres theorem and its applications, *Proc. 38th Symposium on Computational Geometry* (SoCG) 2022, LIPIcs, 62:1–62:15.

J. Fox, J. Pach, A. Suk, On the number of edges of separated multigraphs, *Proc. 29th Symposium on Graph Drawing and Network Visualization* (GD), 2021, LNCS, Springer, 223–227.

J. Fox, J. Pach, A. Suk, Sunflowers in set systems of bounded VC-dimension, *Proc. 37th Symposium on Computational Geometry* (SoCG) 2021, LIPIcs, 37:1–37:13.

J. Fox, J. Pach, A. Suk, Bounded VC-dimension implies the Schur-Erdős conjecture, *Proc. 36th Symposium on Computational Geometry* (SoCG) 2020, LIPIcs, 46:1–46:8.

J. Fox, J. Pach, A. Suk, Semi-algebraic colorings of complete graphs, *Proc. 35th Symposium on Computational Geometry* (SoCG) 2019, LIPIcs, 36:1–36:12.

M. Mirzaei, A. Suk, On grids in point-line arrangements in the plane, *Proc. 35th Symposium on Computational Geometry* (SoCG) 2019, LIPIcs, 50:1-50:11.

J. Fox, J. Pach, A. Suk, Erdos-Hajnal conjecture for graphs with bounded VC-dimension, *Proc. 33rd Symposium on Computational Geometry* (SoCG) 2017, LIPIcs, 43:1-43:15.

J. Fox, J. Pach, A. Suk, Approximating the rectilinear crossing number, *Proc. 24th Symposium on Graph Drawing and Network Visualization* (GD), 2016, LNCS, Springer, 413–426.

A. Suk, Semi-algebraic Ramsey numbers, *Proc. 31st Symposium on Computational Geometry* (SoCG), 2015, LIPIcs, 59–73.

J. Fox, J. Pach, A. Suk, Density and regularity theorems for semi-algebraic hypergraphs, *Proc. Symposium on Discrete Algorithms* (SODA), 2015, 1517–1530.

A. Ruiz-Vargas, A. Suk, C. Tóth, Disjoint edges in topological graphs and the tangled-thrackle conjecture, *Proc. 22nd Symposium on Graph Drawing* (GD), 2014, LNCS 8871, Springer, 284–293.

A. Suk, B. Walczak, New bounds on the maximum number of edges in k-quasi-planar graphs, *Proc. 21st Symposium on Graph Drawing* (GD), 2013, LNCS 8242, Springer, 95–106.

D. Mubayi, A. Suk, A Ramsey-type result for geometric ℓ-hypergraphs, *Proc. 21st Symposium on Graph Drawing* (GD), 2013, LNCS 8242, Springer, 364–375.

D. Conlon, J. Fox, J. Pach, B. Sudakov, A. Suk, Ramsey-type results for semi-algebraic relations, *Proc. 29th Symposium on Computational Geometry* (SoCG), 2013, ACM Press, 309–318.

A. Suk, Density theorems for intersection graphs of t-monotone curves in the plane, *Proc. 20th Symposium on Graph Drawing* (GD), 2012, LNCS 7704, Springer, 352–363.

A. Suk, Disjoint edges in complete topological graphs, *Proc. 28th Symposium on Computational Geometry* (SoCG), 2012, ACM Press, 383–386.

A. Suk, k-quasi-planar graphs, *Proc. 19th Symposium on Graph Drawing* (GD), 2011, LNCS 7034, Springer, 391–402.

J. Pach, A. Suk, M. Treml, Tangencies between families of disjoint regions in the plane, *Proc. 26th Symposium on Computational Geometry* (SoCG), 2010, ACM Press, 423–428.

E. Ackerman, J. Fox, J. Pach, A. Suk, On grids in topological graphs, *Proc. 25th Symposium on Computational Geometry* (SoCG), 2009, ACM Press, 403–412.

Talks

Apr 2022 - Copenhagen-Jerusalem Combinatorics Seminar (online).

Apr 2022 - Jagiellonian TCS Seminar (online), Krakow, Poland.

Apr 2022 - Goodman-Pollack DCG Day (online).

Feb 2022 - MIPT Big Seminar (online).

Sep 2021 - Symposium on Graph Drawing and Network Visualization, Tubingen, Germany.

Jun 2021 - Round the World Relay in Combinatorics (online)

Mar 2021 - EPC Webinar (online).

Mar 2021 - IIT Discrete Math Seminar (online), Chicago, IL.

Jun 2020 - Symposium on Computational Geometry (SoCG), Zurich, Switzerland.

Feb 2020 - UIC Combinatorics and Probability Seminar, Chicago, IL.

June 2019 - Symposium on Computational Geometry, Portland OR, USA.

April 2019 - UIC Mathematical Computer Science Seminar, Chicago, IL.

Mar 2019 - Joint Central-Western AMS meeting, invited address, University of Hawaii.

Feb 2019 - UCSD CS Theory seminar, La Jolla, CA.

Dec 2018 - EPFL Combinatorial Geometry and Optimization Seminar, Lausanne, Switzerland.

Jun 2018 - SIAM Conference on Discrete Mathematics, plenary speaker, University of Colorado.

Apr 2018 - Mathematics Department Colloquium, California State University, Northridge, CA.

Jan 2018 - AMS Sectional Meeting, Beyond Planarity: Crossing Numbers, San Diego, CA.

Dec 2017 - UC Irvine Mathematics Colloquium, Irvine, CA.

Nov 2017 - Workshop on Algebraic Methods in Combinatorics, Harvard University.

Nov 2017 - UCSD Combinatorics Seminar, La Jolla, CA.

Aug 2017 - Eurocomb 2017, plenary speaker, Vienna, Austria.

Jun 2017 - CanaDAM, Ryerson University, plenary speaker, Toronto, ON.

Feb 2017 - Iowa State University, Mathematics Colloquium, Ames, IA.

Dec 2016 - Rutgers Mathematics Colloquium, New Brunswick, NJ.

Dec 2016 - UCSD Mathematics Colloquium, San Diego, CA.

Nov 2016 - Georgia Tech, School of Mathematics Colloquium, Atlanta, GA.

Nov 2016 - UIC MSCS Departmental Colloquium, Chicago, IL.

Oct 2016 - AMS Sectional Meeting, Probabilistic & Extremal Combinatorics, Minneapolis, MN.

Oct 2016 - UIC Computer Science Seminar, Chicago, IL.

Aug 2016 - Extremal Combinatorics at Illinois III (EXCILL 3), Chicago, IL.

Jun 2016 - A New Era of Discrete & Computational Geometry, Ascona, Switzerland.

Jun 2016 - SIAM Conference on Discrete Mathematics, Atlanta, GA.

May 2016 - EPFL Combinatorial Geometry and Optimization Seminar, Lausanne, Switzerland.

Apr 2016 - Carnegie Mellon University, ACO Seminar, Pittsburgh, PA.

Dec 2015 - UIUC Combinatorics Seminar, Urbana, IL.

Nov 2015 - Stanford University Combinatorics Seminar, Stanford, CA.

Nov 2015 - IIT Applied Mathematics Colloquium, Chicago, IL.

Jun 2015 - CG Week workshop on intersection graphs, Eindhoven, Netherlands.

Jun 2015 - Symposium on Computational Geometry (SoCG), Eindhoven, Netherlands.

May 2015 - Ascension of Combinatorics, EPFL, Lausanne, Switzerland.

Jan 2015 - Symposium on Discrete Algorithms (SODA), San Diego, CA.

Dec 2014 - MIT Combinatorics Seminar, Cambridge, MA.

Nov 2014 - Geometric and Enumerative Combinatorics, IMA, Minneapolis, MN.

Sep 2014 - UIC Combinatorics Seminar, Chicago, IL.

Mar 2014 - Combinatorial Geometry Problems at the Algebraic Interface, IPAM, UCLA.

Dec 2013 - EPFL Combinatorial Geometry and Optimization Seminar, Lausanne, Switzerland.

Oct 2013 - MIT Combinatorics Seminar, Cambridge, MA.

Sep 2013 - Symposium on Graph Drawing, Bordeaux, France.

May 2013 - EPFL Combinatorial Geometry and Optimization Seminar, Lausanne, Switzerland.

Jan 2013 - UIC MSCS Departmental Colloquium, Chicago, IL.

Sep 2012 - Symposium on Graph Drawing, Redmond, WA.

Jun 2012 - Symposium on Computational Geometry (SoCG), Chapel Hill, NC.

Feb 2012 - Bernoulli Reunion Conference on Discrete and Computational Geometry, EPFL.

Feb 2012 - EPFL Combinatorial Geometry and Optimization Seminar, Lausanne, Switzerland.

Feb 2012 - Renyi Institute Combinatorics Seminar, Budapest, Hungary.

Dec 2011 - MIT Combinatorics Seminar, Cambridge, MA.

Sep 2011 - Symposium on Graph Drawing, TU Eindhoven, Netherlands.

Dec 2010 - Culminating Workshop in Discrete and Computational Geometry, EPFL.

Nov 2007 - One-Day Combinatorial Geometry Conference, NYU, New York, NY.

Teaching Experience

UCSD	Winter	2022	Probabilistic Combinatorics, Math 261B
UCSD	Fall	2021	Modern Algebra I, Math 103A
UCSD	Fall	2021	Enumerative Combinatorics, Math 184
UCSD	Spring	2021	Calculus for Science and Engineering, Math 20A
UCSD	Winter	2021	Mathematical Reasoning, Math 109
UCSD	Winter	2021	Extremal Combinatorics, Math 158
UCSD	Fall	2020	Enumerative Combinatorics, Math 184
UCSD	Spring	2020	Mathematical Reasoning, Math 109
UCSD	Winter	2020	The Probabilistic Method II, Math 261B
UCSD	Fall	2019	The Probabilistic Method I, Math 261A
UCSD	Fall	2019	Calculus for Science and Engineering, Math 20A
UCSD	Spring	2019	Combinatorics, Ramsey Theory, Math 264C
UCSD	Winter	2019	Student Colloquium, Math 196
UCSD	Spring	2018	Probabilistic Combinatorics and Algorithms, Math 261C
UCSD	Winter	2018	Discrete Math and Graph Theory, Math 154
UCSD	Fall	2017	Calculus for Science and Engineering, Math 20A
UIC	Spring	2017	Applied Linear Algebra
UIC	Fall	2016	Applied Linear Algebra
UIC	Spring	2016	Combinatorics
UIC	Fall	2015	Applied Linear Algebra
UIC	Spring	2015	Discrete Geometry
UIC	Spring	2015	Combinatorics
MIT	Spring	2014	Differential Equations (TA)
MIT	Spring	2013	Differential Equations (TA)
MIT	Fall	2012	Undergraduate Seminar in Discrete Mathematics
EPFL	Spring	2011	Graph Theory (TA)
NYU	Spring	2009	Complex Variables II (TA)
NYU	Fall	2008	Discrete Math
NYU	Spring	2008	Discrete Math
NYU	Fall	2007	Calculus I
NYU	Spring	2007	Real Analysis (TA)
NYU	Fall	2006	Precalculus
NYU	Summer	2006	Precalculus
NYU	Spring	2006	Linear Algebra II (TA)
NYU	Fall	2005	Precalculus (TA)

PhD Advising

Ji Zeng, Mozhgan Mirzaei (Graduated Spring 2020).

Department Service

UCSD: Faculty Advisor, Mathematics-Computer Science (2021-2022), Hiring Committee (2020-2022), Graduate Advising (2020-2022), Pre-Graduate School Advisor (2020-2021), Area course coordinator (2020-2021), Graduate admissions committee (2017-2020), Honors Math Contest committee member (2017-2019), organizer for the UCSD combinatorics seminar (2017-present), graduate advising (2018-present), organizer for the Undergraduate Student Colloquium (2018-2019).

UIC (2014-2017): Graduate admissions committee (2014–2016), colloquium organizer (2015-2016), Master's examination coordinator for MCS (2016). Organizer for the Combinatorics Seminar.

Professional Service

Referee Service: Discrete and Computational Geometry, Journal of Combinatorics, Combinatorica, Computational Geometry Theory and Applications, Journal of Combinatorial Theory Series B, Journey Through Discrete Mathematics – A Tribute to Jiří Matoušek, ACM Symposium on Computational Geometry, Graphs and Combinatorics, International Symposium on

Theoretical Aspects of Computer Science, International Symposium on Graph Drawing, Thirty Essays on Geometric Graph Theory, ACM-SIAM Symposium on Discrete Algorithms, and IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science.

Program Committee Member:

- 25th International Symposium on Graph Drawing and Network Visualization, GD 2017, Boston, MA
- 34th International Symposium on Computational Geometry, SoCG 2018, Budapest, Hungary.
- 30th International Symposium on Graph Drawing and Network Visualization.

Grant proposal reviewing: National Science Foundation (2021), Israel Science Foundation (2015, 2016), Simons Foundation Collaboration Grants (2018).

Conference organizing:

- 5-day workshop entitled "Extremal Problems in Combinatorial Geometry" at Banff International Research Station, Banff, Canada (2018).
- 3-day workshop on Combinatorial Geometry and Ramsey Theory from September 7– 9, 2022 at UCSD.
- 5-day workshop entitled "Extremal Combinatorics and Geometry" at Banff International Research Station, Banff, Canada (2022).