

José Alejandro Samper

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Employment

University of Miami, Miami, FL, 2016 -
Fuqua Research Assistant Professor (Postdoc).

ICERM, Brown University, Providence, RI, Fall 2016
Semester Postdoctoral Fellow.
Program: Topology in motion.

Education

University of Washington, Seattle, 2011-2016
PhD. student in the Math department
Advisors: Isabella Novik and Steven Klee

Universidad de los Andes, Bogotá, Colombia, 2007 - 2011
B. Sc. in Mathematics
Advisor: Federico Ardila

Instituto de Matemáticas Puras e Aplicadas (IMPA), Rio de Janeiro, Brazil, 2011
Visiting student during the summer session, 2011

Mathematical interests

I am interested in algebraic, topological and geometric combinatorics. I am currently focusing on two topics:

- The relationship between the Stanley Reisner rings of simplicial polytopes with the metric structure of special realisations of the polytope.
- The relationship between matroidal and shifted simplicial complex with a special emphasis on face numbers and the Laplacian spectra of simplicial homology theories.

Writings

Papers

1. *Lexicographic shellability, matroids, and pure order ideals.*(with S. Klee)
Advances in Applied Mathematics, **67** (2015), 1-19.
2. *The topology of the external activity complex of a matroid.* (with F. Ardila, and F. Castillo)
Electronic Journal of Combinatorics. **23** (2016) #P3.8.
3. *Higher Chordality: From graphs to complexes.*(with K. Adiprasito, and E. Nevo)
Proc. Amer. Math. Soc. **144** (2016), no. 8, 3317-3329.

4. *A geometric lower bound theorem.*(with K. Adiprasito and E. Nevo)
Geom. Funct. Anal. (GAFA) **26** (2016), no. 2, 359-378.
5. *Quasi-matroidal classes of ordered simplicial complexes*
Submitted.

Extended abstracts

1. *The lower bound theorem for polytopes that approximate C^1 -convex bodies.*(w. K. Adiprasito)
DMTCS Proceedings of FPSAC 14.
2. *Matroids vs. Shifted Complexes.*(w. S. Klee)
Oberwolfach Reports: Geometric and Algebraic Combinatorics.
3. *Relaxations of the matroid axioms: Independence, Exchange and Circuits*
DMTCS Proceedings of FPSAC 16.
4. *The topology of the external activity complex of a matroid.* (with F. Ardila, and F. Castillo)
DMTCS Proceedings of FPSAC 16.

Awards

- Thomas and Grace Tseng Fellowship. University of Washington, 2015-2016
- US Junior Oberwolfach Fellow. Workshop: Algebraic and Geometric Combinatorics. February 2015.
- Beca Fundación Mazda Para el Arte y la Ciencia 2012-2013
- Microsoft Scholar Award, 2011-2014.
- Academic Merit Award of the University of Washington.
- International Mathematics Competition for University Students (IMC), Gold Medal, 2011; Silver Medal, 2010; Bronze medal, 2009.
- Scholarship. Instituto de Matemáticas Puras e Aplicadas. To attend the summer program in January-February 2011.
- International Mathematical Olympiad (IMO), Bronze medal, 2007 and 2006.
- Iberoamerican Mathematical Olympiad, Bronze medal, 2006.
- Colombian Mathematical Olympiad, Gold Medal (top 5 students), 2004-2007.

Talks

Selected

- Formal Power Series and Algebraic Comb. (FPSAC). Vancouver, BC, July 2016
- Western Washington University, Mathematics Colloquium, Bellingham, WA, April 2016
- AMS Session in Alg. and Top. methods in Comb. JMM. Seattle, WA, January 2016.
- Latinos in the Mathematical Sciences, IPAM, Los Angeles, CA, April 2015
- Workshop in Geometric and Algebraic Comb., Oberwolfach, Germany, February 2015
- Formal Power Series and Algebraic Comb. (FPSAC). Chicago, IL, July 2014
- IV Encuentro Colombiano de Combinatoria (ECCO). Bogotá, Colombia, June 2014.
- Congreso Colombiano de Matemáticas, Barranquilla, Colombia. July 2013.

Other conferences

- AMS Session in Geometric Comb. and Comb, Commutative Algebra, Denton, Texas, September 2017 (Upcoming)
- SIAM Minisymposium in Symmetric simplicial complexes and polytopes, Atlanta, GA, July 2017. (Upcoming)
- AMS Session in Topological Combinatorics, Memphis, TN, October 2015.
- AMS Session in Enumerative and Algebraic Combinatorics, Chicago, IL, October 2015.
- Underrep. Students in Top. and Algebra. USTARS 2014. Berkeley, CA, April 2014.
- 1er Encuentro de Exolímpicos: Maria Fest, U. Antonio Nariño, Bogotá, Colombia, July 2013.
- Grad. Stud. Comb. Conference, University of Minnesota, MN. April 2013

Research Seminars

- University of Washington, Combinatorics Seminar, Seattle, WA, Apr. 2017, Apr. 2016 , Oct. 2014, Apr. 2014.
- Online seminar of the Applied Algebraic Topology Research Network, April 2017
- University of Miami, Combinatorics Seminar, Coral Gables, FL, Feb 2017, Nov. 2015.
- ICERM postdoc seminar, ICERM, Providence, RI, Oct. 2016
- University of Kentucky, Discrete CATS seminar, Lexington, KY, November 2015.
- University of British Columbia, Discrete Math Seminar, Vancouver, BC, November 2015.

- University of California, Combinatorics Seminar, Berkeley, CA, October 2015.
- University of California, Combinatorics Seminar, Los Angeles, CA, October 2015, April 2015
- Northwestern University. Graduate Student Seminar, Evanston, IL, October 2015.
- University of Minnesota, Combinatorics Seminar, Minneapolis, MN, September 2015.
- University of Minnesota, Grad Student Comb. Seminar, Minneapolis. MN, September 2015.
- University of Michigan, Combinatorics seminar, Ann Arbor, MI, September 2015.
- McGill University, Student Discrete Math Seminar, Montreal, QC, September 2015.
- Université du Québec À Montreal, Combinatronics seminar, Montreal, QC, September 2015.
- Binghamton University, Combinatorics seminar, Binghamton, NY, September 2015.
- Cornell University, Discrete Geometry and Combinatorics Seminar, Ithaca, NY, August 2015.
- University of Kansas, Combinatorics Seminar, Lawrence, KA, April 2015.
- Aalto University, Algebra and Combinatorics Seminar, Helsinki, Finland, September 2013.

Posters

- Formal Power Series and Algebraic Combinatorics (FPSAC), Vancouver, BC, July 2016
- Geometric and Enumerative Combinatorics, Institute for Mathematics and Applications, Minneapolis, MN, November 2014.
- CoMeTA 2013: Combinatorial methods in topology and algebra, Palazzone di Cortona, Italy, September 2013.

Other math related activities

- UW Combinatorics pre seminar organizer, September 2013- May 2014.
- Coordinator, International Mathematical Olympiad, Santa Marta, Colombia, July 2013.
- UW Student discrete mathematics seminar organizer, 2013.
- Member of the organizing committee, Colombian Mathematical Olympiad, 2008- 2011.
- Colombian Team Deputy Leader, Iberoamerican Mathematical Olympiad, 2010.
- Colombian Team Deputy Leader, Central American and Caribbean Math. Olympiad, 2010.
- Colombian Team Coach, American Regions Math League (ARML), 2008-2011.

Teaching experience

Teaching Assistant, MSRI

- Summer school: Positivity questions in Geometric Combinatorics.
Course: Generalized Lower Bound Theorems by Eran Nevo.

Instructor, University of Miami:

- Survey of Modern Algebra, Math 461, Spring 2017
- Calculus III, Math 211, Spring 2017.

Instructor, University of Washington:

- Matrix algebra with applications, Math 308, Spring 2016, Winter 2016, Fall 2014.
- Differential Equations, Math 307, Summer 2015.
- Advanced Multivariable Calculus I, Math 324, Spring 2015.

Grader, University of Washington:

- Combinatorial theory I, Math 461, Fall 2012, Fall 2013.
- Combinatorial theory II, Math 462, Winter 2013.

Teaching assistant, University of Washington:

- Calculus and Analytic Geometry I, Math 124, Fall 2011, Winter 2012.

Teaching assistant, Awesomemath Summer Program (AMSP): Summer 2012

Coach, Colombian Mathematical Olympiad training camps: 2008-2011

- Taught various courses in number theory, combinatorics and algebra.

Undergraduate teaching assistant, Universidad de los Andes:

- Linear Algebra, Fall 2010
- Integral calculus and differential equations, Spring 2010.

Undergraduate grader, Universidad de los Andes:

- Abstract Algebra, Measure and integration and Commutative Algebra

Language skills

- Spanish. Native speaker
- German. Fluent
- English. Fluent
- Portuguese. Intermediate.

References

Available upon request.