Laura Escobar

Department of Mathematics and Statistics
Washington University in St. Louis
One Brookings Drive
St. Louis, MO 63130, USA

laurae at wustl dot edu
https://www.math.wustl.edu/~escobar

EDUCATION

Ph.D. in Mathematics, Cornell University, USA   2015
Master of Arts in Mathematics, San Francisco State University, USA   2010
Bachelor of Mathematics, Universidad de los Andes, Colombia   2008

EMPLOYMENT

Assistant Professor, Washington University in St. Louis, USA   2018 - Current
J.L. Doob Research Assistant Professor, University of Illinois at Urbana-Champaign,   2015 - 2018
USA
Postdoctoral Fellow, The Fields Institute thematic program in Combinatorial   Fall 2016
Algebraic Geometry, Canada
Einstein Postdoctoral Researcher, TU Berlin, Germany   Summer 2015

GRANTS

- NSF CAREER Award, 2022-2027
- NSF Grant, Combinatorics, 2019-2022
- NSF Conference Grant, Combinatorics, 2020
- AMS Simons Travel Grant, 2017
- AWM Mentoring Travel Grant, 2017

VISITING POSITIONS

KTGU Scholar, Kyoto University, Kyoto, Japan   2 months, 2023
Visiting Assistant Professor, McMaster University, Hamilton, ON, Canada   2 months, 2022
Fields Research Fellow, The Fields Institute, Toronto, ON, Canada   1 month, 2022

PREPRINTS

[1] Laura Escobar, Patricio Gallardo, Javier González Anaya, José L. González, Guido Montúfar, and Alejandro H. Morales. Enumeration of max-pooling responses with generalized permutohedra. arXiv:2209.14978.

[2] Laura Escobar, Martha Precup, and John Shareshian. Hessenberg varieties of codimension one in the flag variety. arXiv:2208.06299.

[3] Roger E. Behrend, Federico Castillo, Anastasia Chavez, Alexander Diaz-Lopez, Laura Escobar, Pamela E. Harris, and Erik Insko. Partial permutohedra. arXiv:2207.14253.

[4] Jason A. Anema and Laura Escobar. Edge Constrained Vertex Colorings and their Applications to Genomics. arXiv:2110.07101.

[5] Laura Escobar, Martha Precup, and John Shareshian. Which Schubert varieties are Hessenberg varieties? arXiv:2107.07929.

[6] Laura Escobar, Alex Fink, Jenna Rajchgot, and Alexander Woo. Gröbner bases, symmetric matrices, and type C Kazhdan–Lusztig varieties. arXiv:2104.09589.

PUBLICATIONS

[1] Maria Donten-Bury, Laura Escobar, and Irem Portakal. Complexity of the usual torus action on Kazhdan–Lusztig varieties. arXiv:2111.13540. Accepted to *Algebraic Combinatorics*.

[2] Laura Escobar, Benjamin J. Wyser, and Alexander Yong. K-orbit closures and Barbasch–Evens–Magyar varieties. *Pacific J. Math.* 320, No. 1, 103–132. 2022

[3] Laura Escobar and Megumi Harada. Wall-crossing for Newton–Okounkov bodies and the tropical Grassmannian. *Int. Math. Res. Not. IMRN*, (7):5152–5203, 2022.

[4] Federico Ardila and Laura Escobar. The harmonic polytope. *Selecta Math. (N.S.)*, 27(5):Paper No. 91, 2021.

[5] Laura Escobar and Kiumars Kaveh. Convex polytopes, algebraic geometry and combinatorics, *Notices of the AMS*, 67(8):1116–1123, 2020.

[6] Laura Escobar. A brief survey about moment polytopes of subvarieties of products of Grassmanians. *Algebraic and Geometric Combinatorics on Lattice Polytopes, Proceedings of the Summer Workshop on Lattice Polytopes, 23 July - 10 August 2018*, pp. 200-216, 2019.

[7] Laura Escobar, Oliver Pechenik, Bridget E. Tenner, and Alexander Yong. Rhombic tilings and Bott-Samelson varieties. *Proc. Amer. Math. Soc.*, 146(5):1921–1935, 2018.

[8] Laura Escobar and Karola Mészáros. Subword complexes via triangulations of root polytopes. *Algebraic Combinatorics*, 1(3):395–414, 2018.

[9] Laura Escobar and Alexander Yong. Newton polytopes and symmetric Grothendieck polynomials. *C. R. Math. Acad. Sci. Paris*, 355(8):831–834, 2017.

[10] Laura Escobar and Allen Knutson. The multidegree of the multi-image variety. In *Combinatorial algebraic geometry*, volume 80 of *Fields Inst. Commun.*, pages 283–296. Fields Inst. Res. Math. Sci., Toronto, ON, 2017.

[11] Laura Escobar and Karola Mészáros. Toric matrix Schubert varieties and their polytopes. *Proc. Amer. Math. Soc.*, 144(12):5081–5096, 2016.

[12] Laura Escobar. Brick manifolds and toric varieties of brick polytopes. *Electron. J. Combin.*, 23(2):Paper 2.25, 18, 2016.

AWARDS AND HONORS

- **Teacher Ranked as Excellent**, University of Illinois at Urbana-Champaign, Fall 2015
- **Robert John Batting Graduate Prize**, for Excellence and Promise in Mathematics, Cornell University, 2014.
- **Department of Mathematics Teaching Award**, Cornell University, 2014.
- **Graduate Student Award for Distinguished Achievement**, San Francisco State University, 2010.
- **SFSU Alumni Association Graduate Scholarship**, San Francisco State University, Spring 2009.
- **Provost Scholarship**, San Francisco State University, 2008-2009.
- **Sylow Algebra Prize**, San Francisco State University, 2008-2009.
- **Lawrence Chang Memorial Scholarship Award**, San Francisco State University, Fall 2008, Fall 2009.
- **Beca Uniandinos**, Fall 2007, Spring 2008.

ADVISING

Cesar Meza. Ph.D. Student. Washington University in St. Louis. Current.
Jodi McWhirter. Ph.D. Student. Washington University in St. Louis. Current.
Ryan Roach. Honors Thesis. Washington University in St. Louis. 2022.
Yue Wu. Honors Thesis. Washington University in St. Louis. 2021.

RECENT SEMINARS AND COLLOQUIA

2022
- *Applied CATS Seminar at KTH Royal Institute of Technology*, November 2022; Stockholm, Sweden.
- *UIUC Combinatorics Colloquium*, November 2022; Urbana-Champaign, IL, USA.
- *The Fields Institute Seminar on Matroids: Combinatorics, Algebra and Geometry*, October 2022; Toronto, ON, Canada.
- *McMaster Department Colloquium*, October 2022; Hamilton, ON, Canada.
- *Cornell Discrete Geometry and Combinatorics Seminar*, September 2022; Ithaca, NY, USA.
- *Copenhagen-Jerusalem Combinatorics Seminar*, February 2022; Denmark and Israel.

2021
- *Bochum-Frankfurt Combinatorics Seminar*, November 2021; Germany.
- *Simon Fraser University Algebraic Geometry Seminar*, November 2021; Vancouver, BC, Canada.
- *Raising Voices*, October 2021; San Francisco State University, San Francisco, CA, USA.
- *Seminario Sabanero de Combinatoria*, October 2021; Bogotá, Colombia.
- *Latin American Geometría Algebraica Real y Tropical Seminar*, September 2021; Latin America.
- *Nottingham University Online Algebraic Geometry Seminar*, June 2021; Nottingham, UK.
- *Coloquio de la Universidad de los Andes*, May 2021; Bogotá, Colombia.

- *University of Kansas Combinatorics Seminar*, May 2021; Lawrence, KS, USA.
- *Tropical Geometry in Zoom (TGiZ)-Seminar*, February 2021; Online.

2020

- *Coloquio Oaxaqueño*, December 2020; Oaxaca, Mexico.
- *Brown Combinatorics Seminar*, November 2020; Providence, RI, USA.
- *UCLA Combinatorics Seminar*, October 2020; Los Angeles, CA, USA.
- *UC Davis Algebraic Geometry Seminar*, October 2020; Davis, CA, USA.
- *Simon Fraser University Discrete Mathematics Seminar*, October 2020; Vancouver, BC, Canada.
- *University of Kentucky Algebra Seminar*, October 2020; Lexington, KY, USA.
- *Stanford's Algebraic Geometry Seminar*, July 2020; Stanford, CA, USA.
- *FU Berlin Discrete Geometry Seminar*, July 2020; Berlin, Germany.

2019

- *McMaster University Geometry Seminar*, June 2019; Hamilton, ON, Canada.

2017

- *San Marcos State University Colloquium*, December 2017; San Marcos, TX, USA.
- *University of Georgia Colloquium*, December 2017; Athens, GA, USA.
- *Texas A&M Colloquium*, December 2017; College Station, TX, USA.
- *Washington University in St. Louis Colloquium*, November 2017; St. Louis, MO, USA.
- *CUNY Queens Colloquium*, November 2017; New York, NY, USA.
- *University of Pittsburgh Algebra, Combinatorics, and Geometry Seminar*, November 2017; Pittsburgh, PA, USA.
- *UIUC Algebra, Geometry, and Combinatorics Seminar*, September 2017; Urbana-Champaign, IL, USA.
- *Four-Lecture Series at Osaka City University Advanced Mathematical Institute*, June 2017; Osaka, Japan.
- *University of Washington Combinatorics Seminar*, April 2017; Seattle, WA, USA.
- *University of Minnesota Combinatorics Seminar*, March 2017; Minneapolis, MN, USA.
- *University of Minnesota Student Combinatorics Seminar*, March 2017; Minneapolis, MN, USA.
- *University of Miami Combinatorics Seminar*, March 2017; Miami, FL, USA.
- *University of Kentucky Discrete CATS Seminar*, February 2017; Lexington, KY, USA.

RECENT CONFERENCE PRESENTATIONS

2022

- *BIRS Workshop on Toric Degenerations*, December 2022; Banff, AB, Canada.
- *BIRS Workshop on Interactions between Hessenberg Varieties, Chromatic Functions, and LLT Polynomials*, October 2022; Banff, AB, Canada.
- *Latinx in the Mathematical Sciences Conference*, July 2022; IPAM, Los Angeles, CA, USA.
- *Graduate Student Combinatorics Conference*, March 2022; San Diego, CA, USA.

- *Virtual Workshop for Women in Commutative Algebra and Algebraic Geometry*, February 2022; The Fields Institute, Toronto, ON, Canada.
- *Combinatorial Algebra meets Algebraic Combinatorics*, January 2022; The Fields Institute, Toronto, ON, Canada.

2021

- *IMPANGA 20 at Banach Center*, July 2021; Będlewo, Poland.
- *CMS Summer Meeting Special Session on Recent Developments in Gröbner Geometry*, June 2021; Online, Canada.
- *Polytopics: Recent advances on polytopes*, April 2021; MPI Leipzig, Germany.
- *ICERM workshop: Algebraic Geometry and Polyhedra*, April 2021; Providence, RI, USA.

2020

- *AlCoVE: an Algebraic Combinatorics Virtual Expedition*, June 2020; International Online Conference.
- *IMPANGA 20 at Banach Center*, June 2020; Będlewo, Poland. (Postponed to 2021 due to Covid-19.)
- *Great Plains Combinatorics Conference*, April 2020; Fargo, ND, USA. (Postponed to 2022 due to Covid-19.)
- *Graduate Student Combinatorics Conference*, March 2020; San Diego, CA, USA. (Postponed to 2022 due to Covid-19.)

2019

- *CMS Winter Meeting Special Session on Combinatorial Algebraic Geometry*, December 2019; Toronto, ON, Canada.
- *CMS Winter Meeting Special Session on Convexity in Algebraic Geometry and Symplectic Geometry*, December 2019; Toronto, ON, Canada.
- *SACNAS Scientific Symposia Session on Latinxs Count!*, October 2019; Honolulu, HI, USA.
- *AMS Special Session on Algebraic and Geometric Combinatorics*, September 2019; Madison, WI, USA.
- *AMS Special Session on Combinatorial Algebraic Geometry*, September 2019; Madison, WI, USA.
- *CLA Session in Algebraic Combinatorics*, August 2019; Ciudad de México, México.
- *Días de Combinatoria, Minicourse*, July 2019; Universidad del Cauca, Popayán, Colombia.
- *AWM Research Symposium, Session in Combinatorial Algebra*, April 2019; Houston, TX, USA.

2018

- *AMS Special Session on Multiplicities and Volumes: An interplay among Algebra, Combinatorics, and Geometry*, October 2018; Ann Arbor, MI, USA.
- *AMS Special Session on Combinatorics in algebra and algebraic geometry*, October 2018; Ann Arbor, MI, USA
- *Summer Workshop on Lattice Polytopes*, July 2018; Osaka, Japan.
- *The Fields Institute Workshop Combinatorial Algebraic Geometry Retrospective*, June 2018; Toronto, ON, Canada.

- *AMS Special Session on Topics in Toric Geometry*, April 2018; Boston, MA, USA
- *AMS Special Session on Algebraic, Geometric, and Topological Methods in Combinatorics*, April 2018; Boston, MA, USA
- *AMS Special Session on Special Session on Combinatorial Aspects of Nilpotent Orbits*, April 2018; Boston, MA, USA
- *AMS Special Session on Convex bodies in algebraic geometry and representation theory*, March 2018; Columbus, OH, USA
- *Latinx in the Mathematical Sciences Conference 2018 Session in Recent Advances in Discrete Computational Mathematics*, March 2018; Los Angeles, CA, USA

2017
- *CMS Waterloo Special Session on Toric Geometry*, December 2017; Waterloo, ON, Canada.
- *MSRI Workshop on Geometric and topological combinatorics: Modern techniques and methods*, October 2017; Berkeley, CA, USA
- *AMS Special Session on Polynomials in Enumerative, Algebraic, and Geometric Combinatorics*, September 2017; Buffalo, NY, USA.
- *AMS Special Session on Algebraic Combinatorics of Flag Varieties*, September 2017; Denton, TX, USA.
- *AMS Special Session on Geometric Combinatorics and Combinatorial Commutative Algebra*, September 2017; Denton, TX, USA.
- *SIAM Conference on Applied Algebraic Geometry: Minisymposium on Algebraic Vision*, August 2017; Atlanta, GA, USA.
- *AMS Special Session on Combinatorial and Computational Commutative Algebra and Algebraic Geometry*, April 2017; Pullman, WA, USA.
- *AMS Special Session on Algebraic and Enumerative Combinatorics with Applications*, April 2017; Bloomington, IN, USA.

TEACHING EXPERIENCE

Washington University in St. Louis, 2018-Current

- Toric Varieties – Spring 2022
- Calculus of Several Variables – Fall 2021, Fall 2018
- Foundations for Higher Mathematics with Writing – Spring 2021
- Calculus I – Fall 2020
- Calculus III – Spring 2020
- Graph Theory – Fall 2019
- Combinatorial Optimization – Fall 2019
- Introduction to Combinatorics – Spring 2019

University of Illinois at Urbana-Champaign, 2015-2018

- Multivariable Calculus – Spring 2018.
- Linear Programming – Fall 2017, Spring 2017
- Introduction to Combinatorics – Spring 2016

- Introduction to Discrete Mathematics – Fall 2015

Cornell University,

- Calculus I – Fall 2013, Fall 2011

San Francisco State University, 2008-2010

- Algebra II – Fall 2008 to Spring 2010

RECENT PROFESSIONAL SERVICE AND OUTREACH

AWM Schafer Prize Selection Committee,   2023-2026
  Association for Women in Mathematics, USA

Member of the Steering Committee,   2022-current
  Encuentro Colombiano de Combinatoria, Colombia

Co-organizer of the Combinatorics Seminar,   2018-current
  Washington University in St. Louis, MO USA

Faculty Advisor of the Graduate Student Combinatorics Conference 2023,   2021-2023
  Washington University in St. Louis, MO, USA

Member of the Scientific Committee,   2019-2022
  Encuentro Colombiano de Combinatoria, Colombia

Co-organizer of the AMS Special Session on Latinxs in Combinatorics,   April 2022
  Joint Mathematics Meetings, Seattle, WA, USA

Taught Math Teacher Circle at Ladue High School,   April 2022
  Washington University in St. Louis, MO, USA

Facilitator of the breakout session "Being a mathematician from an under-   January 2022
represented group",
  Nebraska Conference for Undergraduate Women in Mathematics, Lincoln, NE,
  USA

Co-organizer of the Online Seminar Algebra, Geometry, and Combinatorics   2020-2021

Co-organizer of the AMS Special Session on Algebraic and Combinatorial   May 2021
Aspects of Polytopes,
  Spring Western Sectional Meeting, San Francisco, CA, USA

Presenter for Día Internacional de las Matemáticas,   March 2021
  Universidad de los Andes, Bogotá, Colombia

Random Bits of Advice Panelist,   January 2020
  Nebraska Conference for Undergraduate Women in Mathematics, Lincoln, NE,
  USA

Mentor Judge for SACNAS   October 2019
  Honolulu, HI, USA

Co-organizer of the Algebra, Geometry and Combinatorics Day (AlGeCom),   September 2019

Washington University in St. Louis, USA

Co-organizer of the summer school Días de Combinatoria, Universidad del   July 2019
Cauca, Popayán, Colombia.

Co-organizer of the AMS Special Session on Latinx in Math,   January 2019
Joint Math Meetings, Baltimore, MD, USA

Member of the organizing committee,   2018, 2016, 2012
Encuentro Colombiano de Combinatoria, Colombia

Co-organizer of the AMS Special Session on Combinatorics and Geometry,   January 2018
Joint Math Meetings, San Diego, CA, USA

Co-organizer of the Algebra, Geometry and Combinatorics Seminar,   2017-2018
University of Illinois at Urbana-Champaign, USA

Founder and Co-organizer of the Doob Colloquium,   2015-2018
University of Illinois at Urbana-Champaign, USA

Moderator for Latinas in STEM panel,   November 2017
University of Illinois at Urbana-Champaign, USA

Co-organizer of the Algebra, Geometry and Combinatorics Day (AlGeCom),   April 2017
University of Illinois at Urbana-Champaign, USA

REFEREEING AND REVIEWING

Advances in Mathematics, Electronic Journal of Combinatorics, Communications in Algebra, Discrete & Computational Geometry, Forum of Mathematics - Sigma, International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC), International Mathematics Research Notices (IMRN), Journal of Combinatorial Theory A (JCTA), Mathematical Reviews, NSF, Selecta Mathematica, SIAM Journal on Applied Algebra and Geometry (SIAGA).