

# Laura Escobar

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## EMPLOYMENT

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- J.L. Doob Research Assistant Professor**, U. of Illinois at Urbana-Champaign, USA      2015 - 2018  
Supervisor: Alexander Yong
- Postdoctoral Fellow**, The Fields Institute thematic program in Combinatorial Algebraic Geometry, Canada      Fall 2016
- Einstein Postdoctoral Researcher**, TU Berlin, Germany      Summer 2015  
Supervisor: Bernd Sturmfels

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## EDUCATION

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- Ph.D. in Mathematics**, Cornell University,      2015  
Advisor: Allen Knutson
- Master of Arts in Mathematics**, San Francisco State University,      2010  
Advisor: Federico Ardila
- Bachelor of Mathematics with a Minor in Japanese Language and Culture**,      2008  
Universidad de los Andes

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## RESEARCH INTERESTS

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My research is in geometric combinatorics and combinatorial algebraic geometry. I develop combinatorial models to explain geometry, and conversely. I have worked on Schubert varieties, Bott-Samelson resolutions, symmetric orbit closures, toric varieties and Newton-Okounkov bodies.

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## PUBLICATIONS

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- [1] Laura Escobar, Benjamin J. Wyser, and Alexander Yong.  $K$ -orbit closures and Barbasch-Evens-Magyar varieties, *submitted*. arXiv:1708.06663.
- [2] Laura Escobar and Alexander Yong. Newton polytopes and symmetric Grothendieck polynomials. *C. R. Math. Acad. Sci. Paris*, 355(8):831–834, 2017.
- [3] Laura Escobar and Allen Knutson. The multidegree of the multi-image variety, *submitted*. arXiv:1701.03852.
- [4] Laura Escobar, Oliver Pechenik, Bridget E. Tenner, and Alexander Yong. Rhombic tilings and Bott-Samelson varieties. *Accepted to Proc. Amer. Math. Soc.*. arXiv:1605.05613.
- [5] Laura Escobar and Karola Mészáros. Toric matrix Schubert varieties and their polytopes. *Proc. Amer. Math. Soc.*, 144(12):5081–5096, 2016.
- [6] Laura Escobar and Karola Mészáros. Subword complexes via triangulations of root polytopes, *submitted*. arXiv:1502.03997.
- [7] Laura Escobar. Brick manifolds and toric varieties of brick polytopes. *Electron. J. Combin.*, 23(2):Paper 2.25, 18, 2016.
- [8] Laura Escobar. Star<sup>1</sup>-convex functions on tropical linear spaces of complete graphs. In *24th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2012)*, Discrete Math. Theor. Comput. Sci. Proc., AR, pages 709–720. Assoc. Discrete Math. Theor. Comput. Sci., Nancy, 2012.

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**GRANTS**

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- AMS Simons Travel Grant, 2017
- AWM Mentoring Travel Grant, 2017.

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**INVITED TALKS**

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- *University of Pittsburgh Algebra, Combinatorics, and Geometry Seminar*, November 2017; Pittsburgh, PA.
- *Four-Lecture Series at Osaka City University Advanced Mathematical Institute*, June 2017; Osaka, Japan.
- *University of Washington Combinatorics Seminar*, April 2017; Seattle, WA.
- *University of Minnesota Combinatorics Seminar*, March 2017; Minneapolis, MN.
- *University of Minnesota Student Combinatorics Seminar*, March 2017; Minneapolis, MN.
- *University of Miami Combinatorics Seminar*, March 2017; Miami, FL.
- *University of Kentucky Discrete CATS Seminar*, February 2017; Lexington, KY.
- *University of Toronto Geometric Representation Theory Seminar*, October 2016; Toronto, ON.
- *The Fields Institute Seminar*, August 2016, Toronto, ON.
- *UIUC Algebraic Geometry Seminar*, May 2016; Urbana-Champaign, IL.
- *Ohio State Algebraic Geometry Seminar*, October 2015; Columbus, OH.
- *University of Michigan Commutative Algebra Seminar*, December 2014; Ann Arbor, MI.
- *UC Berkeley Commutative Algebra and Algebraic Geometry Seminar*, February 2014; Berkeley, CA.
- *York University Applied Algebra Seminar*, October 2013; Toronto, ON.
- *Cornell University Computational and Commutative Algebra Seminar*, November 2012; Ithaca, NY.
- *York University Applied Algebra Seminar*, November 2012; Toronto, ON.
- *San Francisco State University Graduate Student Seminar*, Fall 2009; San Francisco, CA.

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**CONFERENCE PRESENTATIONS**

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- *The Fields Institute Workshop Combinatorial Algebraic Geometry Retrospective*, June 2018; Toronto, ON.
- *AMS Special Session on Convex bodies in algebraic geometry and representation theory*, March 2017; Columbus, OH.
- *Latinx in the Mathematical Sciences Conference 2018 Session in Recent Advances in Discrete Computational Mathematic*, March 2018; Los Angeles, CA.
- *CMS Waterloo Special Session on Toric Geometry*, December 2017; Waterloo, ON.
- *MSRI Workshop on Geometric and topological combinatorics: Modern techniques and methods*, October 2017; Berkeley, CA.
- *AMS Special Session on Polynomials in Enumerative, Algebraic, and Geometric Combinatorics*, September 2017; Buffalo, NY.
- *AMS Special Session on Algebraic Combinatorics of Flag Varieties*, September 2017; Denton, TX.
- *AMS Special Session on Geometric Combinatorics and Combinatorial Commutative Algebra*, September 2017; Denton, TX.
- *SIAM Conference on Applied Algebraic Geometry: Minisymposium on Algebraic Vision*, August 2017; Atlanta, GA.
- *AMS Special Session on Combinatorial and Computational Commutative Algebra and Algebraic Geometry*, April 2017; Pullman, WA.
- *AMS Special Session on Algebraic and Enumerative Combinatorics with Applications*, April 2017; Bloomington, IN.
- *CMS Winter Meeting Session on Combinatorial Algebraic Geometry*, December 2016; Niagara Falls, ON.

- *CMS Winter Meeting Session on Equivariant Geometry and Topology*, December 2016; Niagara Falls, ON.
- *Formal Power Series and Algebraic Combinatorics Poster Session*, July 2016; Vancouver, BC.
- *AMS Special Session on Combinatorial Ideals and Applications*, April 2016; Fargo, ND.
- *AMS Special Session on Combinatorial and Computational Commutative Algebra and Algebraic Geometry*, April 2016; Salt Lake City, UT.
- *AWM Workshop at JMM 2016*, January 2016; Seattle, WA.
- *ALGECOM*, October 2015; Ann Arbor, MI.
- *AMS Special Session on Algebraic Combinatorics*, March 2015; East Lansing, MI.
- *AMS Special Session on Cluster Algebras*, January 2015; San Antonio, TX.
- *AMS Special Session on Generalized Catalan Algebraic Combinatorics*, October 2014; Halifax, NS.
- *Formal Power Series and Algebraic Combinatorics Poster Session*, June 2014; Chicago, IL.
- *Encuentro Colombiano de Combinatoria*, June 2014; Bogota, Colombia.
- *AWM Research Symposium, Special Session: Algebraic Combinatorics*, March 2013; Santa Clara, CA.
- *Formal Power Series and Algebraic Combinatorics Poster Session*, July 2012; Nagoya, Japan.
- *Kyoto University Workshop on Convex Polytopes*, July 2012; Kyoto, Japan.
- *Encuentro Colombiano de Combinatoria*, June 2012; Bogota, Colombia.

## TEACHING EXPERIENCE

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### **Instructor, University of Illinois at Urbana-Champaign**

- Linear Programming: Fall 2017, Spring 2017
- Introduction to Combinatorics: Spring 2016
- Introduction to Discrete Mathematics: Fall 2015

### **Instructor, Cornell University**

- Calculus I: Fall 2013, Fall 2011

### **Teaching Assistant, Cornell University**

- Graduate Algebra: Fall 2014, 2012
- Applicable Algebra: Spring 2013, 2015
- Algebra: Spring 2012, 2011
- Calculus I for Engineers: Fall 2010

### **Instructor, San Francisco State University**

- Algebra II: Fall 2008 - Spring 2010

### **Teaching Assistant, San Francisco State University**

- Exploration and Proof: Spring 2010
- Calculus I: Fall 2009
- Modern Algebra II: Fall 2008

### **Instructor, Universidad de los Andes**

- Calculus I: Spring 2008

### **Teaching Assistant, Universidad de los Andes**

- Calculus II: Fall 2007

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**PROFESSIONAL SERVICE AND OUTREACH**


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<b>Member of the organizing committee of Encuentro Colombiano de Combinatoria</b> , Colombia	2012, 2016, 2018
<b>Co-organizer of the AMS Special Session on Combinatorics and Geometry</b> , Joint Math Meetings, San Diego, CA, USA	January 2018
<b>Moderator for Latinas in STEM panel</b> , University of Illinois at Urbana-Champaign, USA	Fall 2017
<b>Co-organizer of the Algebra, Geometry and Combinatorics Seminar</b> , University of Illinois at Urbana-Champaign, USA	2015-Current
<b>Founder and Co-organizer of the Doob Colloquium</b> , University of Illinois at Urbana-Champaign, USA	2017-Current
<b>Co-organizer of the Algebra, Geometry and Combinatorics Day (AlGeCom)</b> , University of Illinois at Urbana-Champaign, USA	Spring 2017
<b>Co-organizer of the Special Seminar on NonLinear Algebra</b> , TU Berlin, Germany	June 2015
<b>Organizer of the Center for Talented Youth Family Saturday Program</b> , Cornell University, USA	March 2015
<b>Designer and Leader of the Center for Talented Youth Family Saturday Program “Polytopes”</b> , Cornell University, USA	March 2015
<b>Workshop assistant for Louis Billera’s course “Matroids, geometric lattices, and arrangements of hyperplanes”</b> , Encuentro Colombiano de Combinatoria, Colombia	Summer 2014
<b>Designer and Leader of the Module “Flat Objects and Optimization” of the Math Explorers Club</b> , Cornell University, USA	Fall 2012
<b>TA Trainer for Incoming Graduate Students</b> , Cornell University, USA	2012-2014
<b>Presenter of Center for Talented Youth Family Saturday Program “Tilings” Workshop</b> , Cornell University, USA	October 2011
<b>Co-organizer of the Toric Varieties Learning Seminar</b> , Cornell University, USA	Fall 2011
<b>Organizer of Professors’ Seminar</b> , San Francisco State University, USA	October 2011

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**SEMINAR LECTURES**


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- **Tropical Geometry Seminar**, University of California Berkeley; Berkeley, CA
  - *Tropical Grassmannian*, March 2014
- **Olivetti Seminar**, Cornell University; Ithaca, NY
  - *A history of the associahedron*, March 2015
  - *Schubert varieties*, March 2013
  - *Tropical linear spaces*, March, 2011
- **Workshop on Quantum/Affine Schubert Calculus**, Eugene, OR
  - *k-double Schur functions*, August 2013
- **Berstein Seminar**, Cornell University; Ithaca, NY
  - *Toric varieties*, March 2012
  - *Equivariant cohomology of toric varieties*, March 2012
- **Discrete Geometry and Combinatorics Seminar**, Cornell University; Ithaca, New York
  - *Symmetric functions II*, October 2011
- **Toric Varieties Learning Seminar**, Cornell University; Ithaca, New York
  - *Singularities and compactness of toric varieties*, October 2011

**AWARDS AND HONORS**

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- **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.

**References**

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Alexander Yong, Professor of Mathematics, UIUC `ayong at math.uiuc.edu`

Allen Knutson, Professor of Mathematics, Cornell University `allenk at math.cornell.edu`

Federico Ardila, Professor of Mathematics, SFSU `federico at math.sfsu.edu`