

# RAFAEL S. GONZÁLEZ D'LEÓN

Department of Mathematics and Statistics · Loyola University Chicago

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## RESEARCH INTERESTS

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I am passionate about the interactions between algebra, combinatorics, topology, and their applications in the sciences. In particular, I am working on or have done work related to:

- Associative algebras and operads using techniques from poset topology.
- The enumerative, algebraic, and geometric combinatorics of flow polytopes.
- Whitney duality of graded posets.
- Catalan combinatorics and its generalizations.
- Representation theory of the symmetric group. Symmetric and Quasisymmetric functions.
- Combinatorial Hopf algebras.
- Combinatorial and algebraic problems in graph theory and matroid theory.
- The combinatorial structure of RNA folding.

## EDUCATION

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### Ph.D. in Mathematics

*August 2014*

*University of Miami, Coral Gables, FL, USA.*

*Thesis: On the combinatorics of the free Lie algebra with multiple brackets.*

*Advisor: Michelle Wachs.*

### M.Sc. in Mathematics

*May 2011*

*University of Miami, Coral Gables, FL, USA.*

### M.Sc. in Mathematics

*June 2009.*

*KTH - Royal Institute of Technology, Stockholm, Sweden.*

*Thesis: Representing matroids by polynomials with the half-plane property.*

*Advisor: Petter Brändén.*

### Electrical Engineering

*March 2006*

*UPB University, Medellín, Antioquia, Colombia.*

*Thesis: Enhancement of the fiber optics network and design of the SDH information transport system of Metro de Medellín.*

## EMPLOYMENT

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### Assistant Professor

*August 2022 – Present*

Loyola University Chicago, Chicago, IL, USA.

### Assistant Professor

*July 2021 – July 2022*

Pontificia Universidad Javeriana, Bogotá, Colombia.

### Docente Investigador (Assistant Professor)

*July 2017 – June 2021*

Universidad Sergio Arboleda, Bogotá, Colombia.

**Director of masters program in applied mathematics**

Universidad Sergio Arboleda, Bogotá, Colombia.

*July 2018 – June 2021*

**Postdoctoral Visitor**

York University. Toronto, ON, Canada.

*August 2017 – December 2017*

**Postdoctoral Scholar**

University of Kentucky. Lexington, KY, USA.

*August 2014 – June 2017*

**Research Assistant (NSF funded)**

University of Miami. Coral Gables, FL, USA.

*June 2012 – July 2014*

**Adjunct Instructor**

UPB University. Medellín, Antioquia, Colombia.

*January 2006 – June 2007*

**Projects Engineer**

Fluidsignal Group, Medellín, Antioquia, Colombia

*August 2005–August 2007*

**Engineering Intern**

Metro de Medellín, Bello, Antioquia, Colombia

*July 2004–January 2005*

**RESEARCH**

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**Preprints**

*Whitney twins, Whitney duals, and operadic partition posets* (With J. Hallam and Y. A. Quiceno D.).  
Arxiv preprint <https://arxiv.org/abs/2307.07480>.

*Realizing the  $s$ -permutahedron via flow polytopes* (With E. Philippe, D. Tamayo Jiménez, A. H. Morales and M. Yip).  
Arxiv preprint <https://arxiv.org/abs/2307.03474>.

**Publications**

*Column convex matrices,  $G$ -cyclic orders, and flow polytopes* (With C. R. H. Hanusa, A. H. Morales and M. Yip).  
Discrete Comput Geom 70, 15931631 (2023).

*A unifying framework for the  $\nu$ -Tamari lattice and principal order ideals in Young's lattice* (With M. von Bell, F. A. Mayorga Cetina and M. Yip).  
Combinatorica (2023): 1-26.

*Hopf algebras of parking functions and decorated planar trees* (With N. Bergeron, S. X. Li, C. Y. A. Pang and Y. Vargas).  
Adv. Appl. Math. Volume 143, February 2023, 102436.

*The Whitney duals of a graded poset* (with J. Hallam)  
J. Combin. Theory Ser. A. Volume 177, January 2021.

*A combinatorial model for computing volumes of flow polytopes* (with C. Benedetti, C. R. H. Hanusa, P. E. Harris, A. Khare, A. H. Morales, M. Yip).  
Trans. Amer. Math. Soc. Volume 372, Number 5, Pages 3369-3404, 2019.

*Signature Catalan Combinatorics* (with C. Ceballos)  
J. Comb. Volume 10, Number 4, 725-773, 2019.

*A family of symmetric functions associated with Stirling permutations.*

J. Comb. Volume 10, Number 4, 675-709, 2019.

*The colored symmetric and exterior algebras.*

J. Algebra 496, 187-215, 2018.

*On the free Lie algebra with multiple brackets.*

Adv. Appl. Math. 79, 37-97, 2016.

*On the (co)homology of the poset of weighted partitions (with M. L. Wachs).*

Trans. Amer. Math. Soc. 368, 6779-6818, 2016.

*A note on the  $\gamma$ -coefficients of the tree Eulerian polynomial.*

Electron. J. Combin. Volume 23, Issue 1, #P1.20, 2016

*On the half-plane property and the Tutte-group of a matroid (with P. Brändén).*

J. Combin. Theory Ser. B. 100, 2010.

## Refereed conference proceedings

*Realizing the  $s$ -permutahedron via flow polytopes (Extended Abstract) (With E. Philippe, D. Tamayo Jiménez, A. H. Morales and M. Yip).*

Sm. Lothar. Combin. 91B (2024), Art. 60, 12 pp. (Proceedings FPSAC 2024)..

*On framed triangulations of flow polytopes, the  $nu$ -Tamari lattice and Young's lattice (with M. von Bell, F. A. Mayorga Cetina and M. Yip).*

Sm. Lothar. Combin. 85B (2021), Art. 42, 12 pp. (Proceedings FPSAC 2021).

*Whitney labelings and 0-Hecke algebra actions on graded posets (with J. Hallam).*

Sém. Lothar. Combin. 80B, Art. 88, 12 pp, 2018. (Proceedings FPSAC 2018).

*The volume of the caracol polytope (with C. Benedetti, C. R. H. Hanusa, P. E. Harris, A. Khare, A. H. Morales, M. Yip).*

Sém. Lothar. Combin. 80B, Art. 87, 12 pp, 2018. (Proceedings FPSAC 2018).

*Whitney duals of geometric lattices (with J. Hallam) (FPSAC 2017).*

Sém. Lothar. Combin. 78B, Art. 82, 12 pp, 2017. (Proceedings FPSAC 2017).

*The colored symmetric and exterior algebras (extended abstract).*

DMTCS Proceedings BC, 575586, 2016. (Proceedings FPSAC 2016).

*On the poset of weighted partitions (with M. L. Wachs).*

DMTCS Proceedings 01, 1029-1040, 2013. (Proceedings FPSAC 2013).

## Thesis and dissertations

*On the Combinatorics of the Free Lie Algebra With Multiple Brackets (Ph.D. thesis).*

UM 2014. [http://scholarlyrepository.miami.edu/oa\\_dissertations/1246](http://scholarlyrepository.miami.edu/oa_dissertations/1246)

*Representing matroids by polynomials with the half-plane property (master thesis).*

KTH 2009.

## FUNDED GRANTS AND PROJECTS

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*AMS-Simons Research Enhancement Grants for PUI Faculty.* PI: R. S. González D'León. Award amount 10800 USD.2024-2027.

*NSF Conference: Research School: Bridges between Algebra and Combinatorics.* PI: R. S. González D'León. DMS Award Number:2416063, Award amount 27000 USD. Start Date:05/01/2024.

*MATH-AmSud collaboration. 22-MATH-01 ALGONCOMB: Algebraic structures supported in families of combinatorial objects.* International coordinator: R. S. González D'León. Local group coordinators: M. Ronco (Chile), A. Gonzalez (Uruguay), Y. Vargas (Venezuela), P.-L. Giscard (France), V. Pons (France), V. Pilaud (France), Award amount: 19300 EUR. 2022-2023 <https://www.sticmathamsud.org/>.

## STUDENTS

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- Master
  - Sergio A. Fernández de Soto Guerrero. U. del Valle. **Thesis** A combinatorial connection between the nonnegative Grassmannian and the multilinear component of the bicolored exterior algebra. September 20 of 2022.
  - Edward Julian Salamanca Valencia - U. Sergio Arboleda. **Thesis** Sobre el método de reescritura en el estudio de operads no simétricos. April 19 of 2022.
  - Camilo Hurtado - U. Sergio Arboleda. **Thesis** Generating pseudoknotted RNA skeleta using the combinatorics of Catalan objects and irreducible chord diagrams. August 4 of 2021.
  - Yeison Quiceno - U. Nacional de Colombia sede Medellín. **Thesis** On Whitney duals of operadic posets. June 18 of 2020.
- Undergraduate
  - Andrés Molina Giraldo - Pontificia Universidad Javeriana. **Thesis** On Whitney duals of geometric lattices. June 5 of 2023.
  - Luis Alfonso Contreras Ordoñez - U. Sergio Arboleda. **Thesis** Cover monoidal categories on species and free cover monoids. July 15 of 2022.
  - Nicolás Ávila Ramirez - U. Sergio Arboleda. **Thesis** The  $\mu$ -polynomials of graph associahedra. June 30 of 2022. (coadvised with Sergio Carrillo).
  - Cesar Orozco - U. Sergio Arboleda. **Thesis** On Hopf algebras related to Segre powers of a partially ordered set on weak compositions and a family of generalizations of the Riemann zeta function. June 4 of 2020.
  - Francisco Alfonso Mayorga Cetina - U. Sergio Arboleda. **Thesis** Characterizing dual graphs associated to triangulations of the Caracol flow polytope. March 10 of 2020.

## TEACHING EXPERIENCE

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### At Loyola University Chicago, Chicago, IL, USA

- *Advanced Topics in Abstract Algebra (MATH 314/414).* Spring 2024.
- *Real World Modeling (MATH 108).* Spring-Fall 2024.
- *Abstract Algebra (MATH 313/413).* Fall 2023 - Fall 2024.
- *Combinatorics (MATH 318/418).* Spring 2023.
- *Applied Calculus 1 (MATH 131).* Spring 2023.
- *Linear Algebra (MATH 212).* Fall 2022-Fall 2023.

- *Calculus 1 (MATH 161)*. Fall 2022.

**At Pontificia Universidad Javeriana, Bogotá, Colombia**

- *Linear Algebra I*. Fall 2021 - Spring 2022.
- *Topology*. Spring 2022.
- *Representation Theory*. Fall 2021.

**At Universidad Sergio Arboleda, Bogotá, Colombia**

- *Matroid theory*. Spring 2021.
- *Enumerative combinatorics and partially ordered sets*. Spring 2020.
- *Topology*. Spring 2018-Spring 2019-Fall 2019-Fall 2020.
- *Partially ordered sets*. Fall 2018.
- *Analysis*. Fall 2018.
- *Combinatorics and Graph Theory*. Spring 2018-Fall 2021.
- *Abstract algebra*. Spring 2018-Fall 2020-Spring 2021.

**At University of Kentucky, Lexington, KY, USA.**

- *Poset cohomology and combinatorial species (MA 714)*. Spring 2017.
- *Calculus 2 (MA 114)*. Fall 2016.
- *Calculus 1 (MA 113)*. Spring 2016.
- *Combinatorics and Graph Theory (MA/CS 415G)*. Fall 2015-Fall 2016.
- *Calculus 4 (MA 214)*. Spring 2015.
- *Matrix Algebra and Its Applications (MA 322)*. Fall 2014-Spring 2015-Spring 2016.

**At University of Miami, Coral Gables, FL, USA.**

- *Calculus 2 (MTH 162)*. Spring 2012.
- *Calculus 1 (MTH 161)*. Fall 2010-Fall 2011.
- *Precalculus 1 (MTH 107)*. Spring 2011.

**At Universidad Pontificia Bolivariana, Medellín, Antioquia, Colombia.**

- *Computer Networks*. Spring/Fall 2006-Spring 2007.
- *Data Networks Lab*. Spring 2007.

## AWARDS AND HONORS

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*Summer Research Stipend award* 2023. Loyola University of Chicago. Chicago, IL, USA.

*Colciencias postdoctoral fellowship* 2019-2020. Administrative Department of Science, Technology and Innovation (Colciencias), Bogotá, Colombia.

*Award for Teaching Excellence* 2019. Mathematics program. Universidad Sergio Arboleda, Bogotá, Colombia.

*Outstanding graduate student in Mathematics* May 2014. University of Miami, Coral Gables, FL, USA.

*Colciencias doctorate fellowship* 2012-2014. Administrative Department of Science, Technology and Innovation (Colciencias), Bogotá, Colombia.

*College of Arts and Sciences Dean's summer research fellowship* Summer 2011. University of Miami, Coral Gables, FL, USA.

## TALKS AND POSTERS

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### In conferences and meetings

- May 9, 2024. ISM Discovery School, Geometry and Combinatorics of Flow polytopes. <http://ism.uqam.ca/flow/en/>. Institut des sciences mathématiques Université du Québec Montréal. Montréal, Québec, Canada.
- Apr 20, 2024. Special Session on Algebraic methods in graph theory and applications, AMS Central Sectional Meeting. University of Wisconsin-Milwaukee, Milwaukee, WI, USA
- Oct 30-31, 2023. Minisimposio álgebras, categorías, y combinatoria. Universidad Nacional de Colombia sede Medellín. Medellín, Colombia.
- July 4, 2023. Conference Journées annuelles du GT CombAlg 2023. Université Paris-Cité Paris, France.
- June 27, 2023. AlCoVE: an Algebraic Combinatorics Virtual Expedition. <https://www.math.uwaterloo.ca/~opecheni/alcove2023.htm>
- Oct 11, 2022. Jornada de Matemáticas discretas. Universidad del Cauca, Popayán, Colombia
- Oct 1, 2022. Special session on Some Tantalizing Conjectures in Discrete Mathematics. AMS Fall Eastern Sectional Meeting. University of Massachusetts-Amherst, Amherst, MA, USA
- May 28, 2021 Canadian Discrete and Algorithmic Mathematics Conference CANADAM, Online meeting, Canada.
- December 7-12, 2020 PRIMER CONGRESO VIRTUAL INTERNACIONAL DE MATEMÁTICA de la Escuela Profesional de Matemáticas. Universidad Nacional de San Agustín de Arequipa, Perú.
- August 12-15, 2019 (Minicourse) XXXVI del Coloquio de la Sociedad Matemática Peruana “CÉSAR CARRANZA SARAIVA”. Universidad Nacional Pedro Ruiz Gallo. Lambayeque, Perú.
- August 8, 2019 Sesión temática en posets y matroides. Coloquio latinoamericano de álgebra. Colegio Nacional, Ciudad de México, México.
- Junio 14, 2019 XXII Congreso Colombiano de Matemáticas 2019. Universidad del Cauca, Popayán, Cauca, Colombia.
- January 24, 2019 Décimo encuentro regional de matemáticas. Universidad de Antioquia, Medellín, Colombia.
- July 27, 2018 ICM Satellite Conference: A Pan-Hemispheric Celebration of Mathematics in Miami. University of Miami, Coral Gables, FL, US.
- July 16, (Poster) 2018 Formal Power Series and Algebraic Combinatorics FPSAC 2018. Dartmouth College, Hanover NH, USA.
- July 17-28, 2017, (Minicourse) Días de Combinatoria DIAS 2017. Universidad Pontificia Bolivariana. Medellín, Colombia.

- April 2, 2017 Special Session on Algebraic and Enumerative Combinatorics with Applications. AMS Sectional Meeting. Indiana University, Bloomington, IN.
- September 24, 2016. Special Session on Plethysm and Kronecker Products in Representation Theory. AMS Sectional Meeting. Bowdoin College, Brunswick, ME.
- July 14, 2016. V Congreso Latinoamericano de Matematicos. Universidad del Norte. Barranquilla, Colombia.
- July 5, 2016. (Poster) FPSAC'16 The 28th International Conference on Formal Power Series and Algebraic Combinatorics. Vancouver, BC, Canada.
- October 17, 2015. Special Session on Topological Combinatorics. AMS Sectional Meeting. University of Memphis. Memphis, TN.
- October 3, 2015. Special Session on Enumerative Algebraic and geometric combinatorics. AMS Sectional Meeting. Loyola University. Chicago, IL.
- August 28, 2015. Algebraic Combinatorics and Applications, The first annual Kliakhandler Conference. Michigan Technological University, Houghton, MI, USA
- April 18, 2015. Special Session on Algebro-Geometric Methods in Graph Theory. AMS Sectional Meeting. U. of Nevada. Las Vegas, NV.
- March 27, 2015. Colloquium-Graduate Students Combinatorics Conference. U. of Kentucky, Lexington, KY.
- March 14, 2015. Special Session on Algebraic Combinatorics. AMS Sectional Meeting. Michigan State University, East Lansing, MI.
- January 5, 2015. Conference in honor of Michelle Wachs. U. of Miami. Miami, FL.
- October 26, 2014. Special Session on Topological Combinatorics and Combinatorial Commutative Algebra. AMS Sectional Meeting. SFSU, San Francisco, CA.
- July 12, 2014. Cuarto Encuentro Colombiano de Combinatoria ECCO2014. Universidad de los Andes, Bogotá, Colombia.
- October 19, 2013. Special Session on Topological Combinatorics. AMS Sectional Meeting. Washington University, St. Louis, MO.
- June 17, 2013. The 11th Nordic Combinatorial Conference (NORCOM). KTH, Stockholm, Sweden.
- June 24, 2013. (Poster) FPSAC'13 The 25th International Conference on Formal Power Series and Algebraic Combinatorics. Paris, France.
- October 14, 2012. Special Session on Algebraic and Topological Combinatorics. AMS Sectional Meeting. Tulane University, New Orleans, LA.

## In seminars

- Nov 29, 2023. Institute for mathematical and statistical innovation IMSI. Chicago, IL, USA
- Oct 16, 2023. Combinatorics seminar. Washington University St. Louis, St. Louis, MO, USA
- Oct 16, 2023. Combinatorics seminar. Washington University St. Louis, St. Louis, MO, USA
- Jul 28, 2023. Math REU DePaul University. Chicago, IL, USA
- Jul 25, 2023. MathIly daily gather. Bryn Mawr College, Bryn Mawr, PA, USA

- June 26, 2023 Seminar GT Combi du Plateau de Saclay at École polytechnique. Paris, France.
- June 21, 2023. Seminar of the geometry institute at TU Graz, Graz, Austria.
- April 28, 2023 Algebra, Combinatorics, and Number Theory Seminar. DePaul University, Chicago, IL, USA.
- March 2, 2023 Math and Statistics colloquium. Reed College. Portland, OR, USA.
- Feb 27, 2023. Department of Mathematics and Statistics Teaching Seminar. Loyola University Chicago, Chicago, IL, USA
- Feb 6, 2023 Applied Algebra Seminar. York University, Toronto, ON, CA.
- Oct 14, 2022. Club de Matemática. Pontificia Universidad Católica de Chile, Santiago, Chile.
- Sep 28, 2022. TACO Topology, Algebra, Combinatorics and Operators. Loyola University Chicago, Chicago, IL, USA
- February 16, 2022 MSU Combinatorics and Graph Theory (C&GT) Seminar. Michigan State University, MI, USA.
- March 15, 2021 Día internacional de las matemáticas. Politécnico Grancolombiano, Bogotá, Colombia.
- March 12, 2021 Combinatorics, Algebra and Geometry Seminar (CAGS). George Mason University, Fairfax, VA, USA.
- February 24, 2021 Coloquio Sergista de Matemáticas. Universidad Sergio Arboleda, Bogotá, Colombia.
- October 19, 2020 Seminario MADIS de Matemáticas Discretas. Universidad del Cauca. Popayán, Colombia
- October 5, 2020 Combinatorics Seminar. Washington University in St. Louis, St. Louis, MO, USA
- April 23, 2020 Discrete Math Seminar. UMass Amherst, MA, USA.
- March 5, 2020 Seminario Sabanero de Combinatoria. Fundación Universitaria Konrad Lorenz, Bogotá, Colombia.
- September 19, 2019 Seminario Sabanero de Combinatoria. Pontificia Universidad Javeriana, Bogotá, Colombia.
- April 22, 2019 Representation theory seminar. UMass Amherst, MA, USA.
- April 8, 2019 Combinatorics seminar. University of Miami, FL, USA.
- March 15, 2019. Seminario Sabanero de Combinatoria. Universidad Sergio Arboleda. Bogotá, Colombia.
- September 17, 2018. Seminario Sabanero de Combinatoria. Universidad de los Andes. Bogotá, Colombia.
- August 22, 2018. Coloquio Universidad Sergio Arboleda. Bogotá, Colombia.
- March 5, 2018. Seminario Sabanero de Combinatoria. Universidad Nacional de Colombia. Bogotá, Colombia.
- November 27, 2017. Applied Algebra Seminar. York University. Toronto, Canada.
- October 30, 2017. Discrete CATS seminar. U. of Kentucky, Lexington, KY.



- September 25, 2017. Applied Algebra Seminar. York University. Toronto, Canada.
- June 21, 2017. Combinatorics Seminar. University of Miami, Coral Gables, FL.
- April 21, 2017. Combinatorics Seminar. Wake Forest University, Winston-Salem, NC.
- April 3, 2017. Discrete CATS seminar. U. of Kentucky, Lexington, KY.
- November 16, 2016. Algebra-Geometry-Combinatorics seminar at SFSU, San Francisco, CA.
- November 14, 2016. Algebra and Discrete Mathematics seminar at UC Davis, Davis, CA.
- October 24, 2016. Discrete CATS seminar. U. of Kentucky, Lexington, KY.
- April 4, 2016. Discrete CATS seminar. U. of Kentucky, Lexington, KY.
- September 14, 2015. Discrete CATS seminar. U. of Kentucky, Lexington, KY.
- May 13, 2015. Combinatorics seminar. U. of Washington. Seattle, WA.
- November 24, 2014. Applied Algebra Seminar. York University. Toronto, Canada.
- October 31, 2014. Discrete CATS seminar. U. of Kentucky, Lexington, KY.
- October 2, 2010. Combinatorics Seminar. U. of Miami, Coral Gables, FL.
- March 2, 2010. Combinatorics Seminar. U. of Miami, Coral Gables, FL.
- May 27, 2009. Combinatorics Seminar. KTH-The Royal Institute of Technology, Stockholm, Sweden.

## CONFERENCES, SEMINARS AND SESSIONS ORGANIZED

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June 17-28, 2024 CIMPA research school: 8th Encuentro Colombiano de Combinatoria ECCO 2024. Universidad del Cauca. Popayán, Colombia. <http://ecco2024.combinatoria.co>.

May 6-10, 2024. ISM Discovery School, Geometry and Combinatorics of Flow polytopes. <http://ism.uqam.ca/flow/en/>. Institut des sciences mathématiques Université du Québec Montréal. Montréal, Québec, Canada.

Apr 20-21, 2024. Special Session on Posets in algebraic and geometric combinatorics, AMS Central Sectional Meeting. University of Wisconsin-Milwaukee, Milwaukee, WI, USA

October 30-31, 2023. Minisimposio álgebras, categorías, y combinatoria. Universidad Nacional de Colombia sede Medellín. <https://sites.google.com/view/minisimposioacc2023/inicio>

April 15, 2023 Algecom-XXIII: Algebra, Geometry and Combinatorics Day. Loyola University Chicago, Chicago, IL, USA. <https://sites.google.com/view/algecom-main/algecom-xxiii>

June 14-25, 2022 CIMPA research school: 7th Encuentro Colombiano de Combinatoria ECCO 2022. Universidad de los Andes, Pontificia Universidad Javeriana, and Universidad Sergio Arboleda. Bogotá, Colombia. <http://ecco2022.combinatoria.co>.

July 18-22, 2022 (Program Committee) 34th Formal Power Series and Algebraic Combinatorics FPSAC 2022. Indian Institute of Science, Bangalore (India). <http://fpsac.org/confs/fpsac-2022/>.

Seminario Sabanero de Combinatoria SeSaCo. Bogotá, Colombia. Spring-Fall 2018, Spring-Fall 2019, Spring-Fall 2020, Spring-Fall 2021, Spring 2022.

September 13-17, 2021 Sesión temática en Combinatoria algebraica de funciones simétricas, cuasisimétricas y aplicaciones <https://www.clam2020.cmat.edu.uy/>. VI Congreso latinoamericano de Matemáticos. Universidad de la República, Montevideo, Uruguay.

Días de Combinatoria DIAS 2019. Universidad del Cauca, Popayán, Colombia. July 15-26, 2019. <http://dias2019.combinatoria.co>

CIMPA research school: 6th Encuentro Colombiano de Combinatoria ECCO 2018. Universidad del Norte. Barranquilla, Colombia. June 5-16, 2018. <http://ecco2018.combinatoria.co>

Días de Combinatoria DIAS 2017. Universidad Pontificia Bolivariana, Medellin, Colombia. July 17-28, 2017. <http://dias2017.combinatoria.co>

AMS special session on applications of Partially Ordered Sets in Algebraic, Topological, and Enumerative Combinatorics at the 2017 Joint Mathematics Meetings. Atlanta, GA. January 4-7, 2017.

Special session on algebraic combinatorics, Hopf algebras and tensor categories at the V Congreso Latinoamericano de Matematicos. Universidad del Norte. Barranquilla, Colombia. July 11-15, 2016.

CIMPA research school: 5th Encuentro Colombiano de Combinatoria ECCO 2016. Universidad de Antioquia. Medellin, Colombia. June 13-24, 2016. <http://ecco2016.combinatoria.co>

## OTHER ACTIVITIES

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Member of the steering committee of the Encuentro Colombiano de Combinatoria (ECCO). 2022-.

Member of the gender and equality commission of the Colombian Mathematical Society. 2019-2022.

Co-organizer of the Math Circles program of the Colombian Mathematical Society. Universidad Sergio Arboleda. Spring-Fall 2019.

Co-leader of the research group **Comunidad Colombiana de Combinatoria** with Colciencias code COL0180477 since January of 2016.

Faculty co-advisor for the Math Club. University of Kentucky, Fall 2016-Spring 2017.

Co-organizer of the UM Math Graduate Students Seminar. Fall 2010 to Spring 2012.

Students delegate on the faculty counsel of Electrical Engineering and on the Engineering School 2003-2004. UPB University, Medellín, Colombia.

## SKILLS

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*Languages:* Spanish (native), English (fluent).

*Operating Systems:* GNU/Linux and WINDOWS.

*Computer Languages:* Python, MATLAB, Octave, Sage Math.

## REFERENCES

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*Available on request*