Rafael S. González D'León

Ph.D. student in Mathematics
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Research interests

Algebraic and Topological Combinatorics. Matroid Theory.

Education

Ph.D. in Mathematics, Current (05/2014 Expected).
University of Miami, Coral Gables, Fl, USA.
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 fiber optics network and design of the SDH information transport system of Metro de Medellín.* Metro de Medellín is the company that administers and operates the metropolitan train system of the city.

Academic Employment

Research Assistant (NSF funded).
June 2012 – May 2014.
University of Miami. Coral Gables, Fl, USA.

Teaching Assistant.
August 2009 – May 2012.
University of Miami. Coral Gables, Fl, USA.

Adjunct Instructor.
January 2006 – June 2007.
UPB University. Medellín, Antioquia, Colombia.

Preprints and Publications

On the (co)homology of the poset of weighted partitions (with M. L. Wachs). `http://arxiv.org/abs/1309.5527`.

On the poset of weighted partitions (with M. L. Wachs). DMTCS Proceedings 01 (2013):

1029-1040.

On the free Lie algebra with k linearly compatible brackets and the poset of weighted partitions. In preparation.

Refinements of second-order Eulerian statistics, Stirling symmetric functions and k-Lyndon trees. In preparation.

On the half-plane property and the Tutte-group of a matroid (with P. Brändén). J. Combin. Theory Ser. B. 100-2010.

Representing matroids by polynomials with the half-plane property (master thesis). KTH 2009.

Talks, Lectures and Posters
The combinatorial structure behind the free Lie algebra. November 1, 2013. UM Math Graduate Students Seminar. University of Miami, Coral Gables, FL, USA.

On the free Lie algebra with k compatible brackets and poset topology. October 19, 2013. Special Session on Topological Combinatorics. AMS Sectional Meeting. Washington University, St. Louis, MO, USA.

(Poster) On the poset of weighted partitions. June 24, 2013. FPSAC'13 The 25th International Conference on Formal Power Series and Algebraic Combinatorics. Paris, France.

On the poset of weighted partitions. June 17, 2013. The 11th Nordic Combinatorial Conference (NORCOM). KTH, Stockholm, Sweden.

Introduction to graph coloring. March 1, 2013. UM Math Graduate Students Seminar. University of Miami, Coral Gables, FL, USA.

About algebras and operads. November 2, 2012. UM Math Graduate Students Seminar. University of Miami, Coral Gables, FL, USA.

On the (co)homology of the poset of weighted partitions. October 14, 2012. Special Session on Algebraic and Topological Combinatorics. AMS Sectional Meeting. Tulane University, New Orleans, LA, USA.

Weighted partition posets. October 2, 2010. Combinatorics Seminar. University of Miami, Coral Gables, FL, USA.

A cell structure for Grassmann Manifolds. February 17, 2012. UM Math Graduate Students Seminar. University of Miami, Coral Gables, FL, USA.

Generatingfunctionology (or looking for a closed formula for the Fibonacci sequence). October 20, 2011. UMMU University of Miami Mathematics Union. University of Miami, Coral Gables, FL, USA.

What is ... a Matroid?. September 9, 2011. UM Math Graduate Students Seminar. University of Miami, Coral Gables, FL, USA.

About the Potts model and some of its combinatorial relations. September 17, 2010. UM Math Graduate Students Seminar. University of Miami, Coral Gables, FL, USA.

On the Half-plane Property and the Tutte-group of a Matroid. March 2, 2010. Combinatorics Seminar. University of Miami, Coral Gables, FL, USA.

Representing matroids by polynomials with the half-plane property. May 27, 2009. Combinatorics Seminar. KTH-The Royal Institute of Technology, Stockholm, Sweden.

SDH transport networks. Academic semesters 2-2004, 1-2005 and 2-2005. Comunications seminar (Undergraduate course of Electronics, Information Technology, and Telecommunications Engineering programs). UPB University, Medellín, Colombia.

Teaching Experience

Instructor

Calculus 2 (MTH 162). Spring 2012. University of Miami, Coral Gables, FL, USA.
Calculus 1 (MTH 161). Fall 2010 - Fall 2011. University of Miami, Coral Gables, FL, USA.
Precalculus 1 (MTH 107). Spring 2011. University of Miami, Coral Gables, FL, USA.
Computer Networks. Spring/Fall 2006 - Spring 2007. UPB university, Medellín, Antioquia, Colombia.
Data Networks Lab. Spring 2007. UPB university, Medellín, Antioquia, Colombia.

Teaching Assistant

Calculus 2 (MTH 162). Spring 2010. University of Miami, Coral Gables, FL, USA.
Calculus 1 (MTH 161). Fall 2009. University of Miami, Coral Gables, FL, USA.
Math Lab. Assisting students with diverse questions in mathematics. Fall 2009 to Fall 2011. University of Miami, Coral Gables, FL, USA.
Numerical Methods 2. Spring 2008. KTH - The Royal Institute of Technology, Stockholm, Sweden.
Electromagnetism Fundamentals. Fall 2001 - Fall 2005. UPB university, Medellín, Antioquia, Colombia.
Programming Fundamentals. Spring 2001. UPB university, Medellín, Antioquia, Colombia.

Industrial Experience

Fluidsignal Group   *Medellín, Antioquia, Colombia*
Project Engineer   *August 2005–August 2007*

Network design and implementation with open source software tools, information security advisory, project leading in the deployment of a colombian ISP and many other network infrastructure projects, project leading in network security and intrusion testing projects, responsible for risk identification, assessment and mitigation within the organization under the scheme of ISO/IEC 27001, OCTAVE and AS/NZS 4360 standards.

Metro de Medellín   *Bello, Antioquia, Colombia*
Engineering Intern   *July 2004–January 2005*
Design of a metropolitan transport network backbone with SDH standard for the interconnection of all the metro stations and headquarters. Design of new links of optical fiber to enhance the scope over the physical network.

Conferences

Special Session on Topological Combinatorics. AMS Sectional Meeting. Washington University, St. Louis, MO, USA. October 18-20, 2013.

FPSAC'13 The 25th International Conference on Formal Power Series and Algebraic Combinatorics. Paris, France. June 24-28, 2013.

The 11th Nordic Combinatorial Conference (NORCOM). KTH, Stockholm, Sweden. June 17-19, 2013.

Triangle Lectures in Combinatorics (TLC), Seventh meeting. Wake Forest University, Winston -Salem, NC, USA. February 9, 2013.

Special Session on Algebraic and Topological Combinatorics. AMS Sectional Meeting. Tulane University, New Orleans, LA, USA. October 13-14, 2012.

MSRI Summer Graduate Workshop - Cluster Algebras and Cluster Combinatorics. Mathematical Sciences Research Institute, Berkeley, CA, USA. August 1-12, 2011.

Ninth Annual Graduate Student Topology and Geometry Conference. Michigan State University, East Lansing, MI, USA. April 2-3, 2011.

Eighth Annual Graduate Student Topology and Geometry Conference. University of Michigan, Ann Arbor, MI, USA. April 10-11, 2010.

AMS Fall Southeastern Meeting. Florida Atlantic University, Boca Raton, FL, USA. October 30-31, 2009.

Awards and honors

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

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

Best score (129,1 Mean 100 Deviation 10) of UPB University Electronics Engineering test takers (101) and above 99,64 % of all takers (2997) in the Higher Education Qualification Test of Colombia (ECAES). 2005 ICFES. National Ministry of Education. Bogota, Colombia.

First place within Electrical Engineering graduating class 2006. UPB University, Medellín, Antioquia, Colombia

First Place in III Town Tournament of Mathematics (High school Math contest) 1998. D Level. Sabaneta Counsel High School. Sabaneta, Colombia.

First Place in IV Town Tournament of Mathematics (High school Math contest) 1999. D Level. Sabaneta Counsel High School. Sabaneta, Colombia.

Other Activities

Founder and organizer of the UM Math Graduate Students Seminar. Fall 2010 to Spring 2012.

Member of UPB University Choir. Tenor chord. 1-2004–1-2007.

Member of the organizing committee of the X Technical day of Electrical and Electronics Engineering. UPB University. 2004.

Skills

Languages: Spanish (native), English (fluent), French (Beginner).
Operating Systems: GNU/Linux, Unix and WINDOWS.
Computer Languages: C, Python, MATLAB, Maple, Sage.
Other technology topics: LAN and TCP/IP networking.

References

Michelle Wachs
University of Miami
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Petter Brändén
KTH
pbranden@kth.se

Drew Armstrong
University of Miami
armstrong@math.miami.edu

Svante Linusson
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Leticia Oropesa (Teaching)
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l.oropesa@math.miami.edu