Jose Perea

Department of Mathematics **Phone:** + 01-(919) 660-2837
Duke University **Email:** joperea@gmail.com
214 Physics Building **Web:** https://fds.duke.edu/db/aas/math/joperea

Biographical Information

Surname: Perea Benitez

First Name: Jose Andres

Date of Birth: May 25th, 1984

Place of Birth: Cali, Colombia

Citizenship: Colombian

Education

Ph.D., Mathematics, June 2011
Stanford University
Stanford, CA, USA
Adviser: Gunnar Carlsson

B.Sc., Mathematics (Valedictorian/Summa Cum Laude), April 2006
Universidad del Valle
Cali, Valle del Cauca, Colombia
Adviser: Gonzalo Garcia

Positions

Visiting Assistant Professor, Mathematics Department - **Duke University**, August 2011 - Present

Member, Institute for Mathematics and its Applications (**IMA**), **University of Minnesota**, Spring 2014

Research Interests

Theoretical aspects and applications of topological methods to the analysis of data; Computer Vision, Machine learning and Mathematical Biology.

Honors and Awards

Top 5% teachers at Duke: For ranking among the top 5% (university wide) in student evaluations for *Quality of Course or Intellectual Stimulation*, Duke University, Spring 2013.

Special Recognition: Resolution 042, May 10 of 2006, Faculty of Science, Universidad del Valle. For graduating with the highest honors and academic achievements.

Valedictorian: Highest ranking graduating student (out of 850). Universidad del Valle, April 2006.

Laureate Thesis: Highest honor for undergraduate research. Thesis title: **El Teorema de Borsuk-Ulam y Algunas Aplicaciones** (The Borsuk-Ulam Theorem and Some Applications). Universidad del Valle.

Academic Stimulus: (1st place in all semesters during my undergraduate studies.) Recognition to the five students with highest G.P.A. from each academic program. The stimulus takes the form of a waiver in the tuition for the following semester.

Publications

1. J. Perea and J. Harer, *Sliding Windows and Persistence: An Application of Topological Methods to Signal Analysis*, Foundations of Computational Mathematics (Accepted, May, 2014), ISSN 1615-3375 (**Journal Info**: rank 7 of 296 in subject category Mathematics, 2012 Impact Factor 1.918; Journal Citation Reports, Thomson Reuters).
2. J. Perea and G. Carlsson, *A Klein-Bottle-Based Dictionary for Texture Representation*, International Journal of Computer Vision, vol. 107 no. 1 (March, 2014), pp. 75-97, ISSN 0920-5691 (**Journal Info**: rank 9 of 115 in subject category Computer Science/Artificial Intelligence, 2012 Impact factor 3.623; Journal Citation Reports, Thomson Reuters).

Preprints

1. J. Perea, A. Deckard, S. Haase, and J. Harer, *SW1PerS: Sliding Windows and 1-Persistence Scoring; Discovering Periodicity in Gene Expression Time Series Data*, Submitted, 2014.

In Preparation

1. J. Perea, *Projective Coordinates for the Analysis of Data via Line Bundles and their Persistent Characteristic Classes*, 2014.
2. J. Perea, *Obstructions to Compatible Extensions of Mappings*, 2014.
3. N. Strawn, J. Perea and J. Harer, *Measure-theoretic Embeddings of Persistence Diagrams for Classification and Regression Tasks*, 2014.
4. A. P. Stapper and J. Perea, *Characterization and Topological Reconstruction of the Developing Otic Placode at Single Cell Resolution*, 2014.
5. L. Munch, F. Khasawneh and J. Perea, *Persistent Homology of Time-delay embeddings, Chaos and Chatter*, 2014.

Students Advised

Luis Polaco, Masters Program - Mathematics, Universidad de los Andes (co-advised with Andres Angel)

Hamza Ghadyali, Ph.D. Program - Mathematics, Duke University (co-advised with John Harer)

Invited Talks

1. Colloquium, Department of Mathematics, University of Tennessee, February 2015.
2. Colloquium, Department of Mathematics - Data Science series, University of Rochester, January 2015.
3. Workshop: School on Topological Data Analysis and Stochastic Topology, CIMAT, Mexico, January 2015.
4. Colloquium, Department of Mathematics, State University of New York Polytechnic Institute, December 2014.
5. Topology seminar, Department of Mathematics, State University of New York at Albany, December 2014.
6. Colloquium, Department of Mathematics and Statistics, University of Nevada at Reno, November 2014.
7. Workshop: Mathematics of Data Analysis in Cybersecurity, ICERM - Brown University, October 2014.

8. Workshop: Persistent Homology for Biosciences, Michigan State University, October 2014.
9. Geometry and Topology seminar, North Carolina State University, September 2014.
10. Special seminar on Applied Algebraic Topology and Data, Universidad de los Andes, Colombia, June 2014.
11. (ATMCS 6) Algebra and Topology: Methods, Computation and Science, Pacific Institute of Mathematics, University of British Columbia, May 2014.
12. Workshop: Topological Data Analysis, Statistical and Applied Mathematical Sciences Institute (SAMSI), February 2014.
13. Workshop: Topological Data Analysis, IMA Thematic Year on Scientific and Engineering Applications of Algebraic Topology, Institute for Mathematics and its Applications (IMA), October 2013.
14. Topology seminar, Johns Hopkins University, October 2013.
15. Joint Stats Meeting 2013 - Stochastic Aspects of Topology, Montreal, Canada, August 2013.
16. SIAM Conference on Applied and Algebraic Geometry, Colorado State University, August 2013.
17. Workshop: Applied Topology, Bedlewo, Poland, July 2013.
18. XIX Colombian Congress of Mathematics, Universidad del Norte, Barranquilla, Colombia, July 2013.
19. 29th ACM Symposium on Computational Geometry - Workshop on Computational Topology and Data Analysis, Rio de Janeiro, Brazil, June 2013.
20. Special Session on Computational Topology, MathFest, Madison WI, August 2012.
21. School of Geometry, Universidad del Valle, Cali, Colombia, July 2012.
22. Special Session on Computational Topology, Joint Mathematics Meeting, Boston MA, January 2012.
23. SIAM Conference on Applied and Algebraic Geometry, North Carolina State University, October 2011.
24. (ATMCS 4) Algebra and Topology: Methods, Computation and Science, Münster, Germany, June 2010.
25. Colloquium, Mathematics Department, Universidad del Valle, Colombia, August 2009.

Teaching Experience

Algebraic Structures II - Math502: Instructor, **Duke University**, Spring 2015.

Mini-course: Some Applications of Topology to the Analysis of Data, II Escuela Colombiana de Matematicas, **Universidad de Antioquia**, Summer 2014.

Intro to Abstract Algebra - Math401: Instructor, **Duke University**, Spring 2013. This course was ranked (with respect to teaching evaluations) among the top 5% of all undergraduate medium classes (20 - 59 students) at Duke during Spring 2013, on the categories *Quality of Course* or *Intellectual Stimulation*.

Introduction to MATLAB for Multivariate Mathematics - Math51M: Instructor, **Stanford University**, Fall 2010.

Complex Analysis Geometry and Topology - Math215a: (Graduate level class) TA, **Stanford University**, Fall 2009 and Fall 2007.

Linear Algebra and Multivariable Calculus - Math51: TA several times, **Stanford University**.

Algebra and Matrix Theory - Math113: TA, **Stanford University**, Winter 2008.

Multivariable Calculus: Instructor, **Universidad del Valle**, Colombia, Spring 2006.

Professional Service

Reviewer for *SODA2015*, *Journal of Computational Chemistry*, *Foundations of Computational Mathematics*, *Homology, Homotopy & Applications* and *Revista de Ingenieria Biomedica*.

Department Service

2009-2010 and 2010-2011, Liaison between the Mathematics Department and the Center for Teaching and Learning at Stanford University.

References

Provided upon request

December 1, 2014