IVAN CONTRERAS

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EMPLOYMENT

	Amherst College
2018-Present	Visiting Assistant Professor
2016-2018	**University of Illinois Urbana-Champaign**
	J.L. Doob Research Assistant Professor
2014-2016	**University of California Berkeley**
	SNSF (Swiss National Science Foundation) Postdoctoral Fellow

RESEARCH INTERESTS

Differential Geometry, Lie Theory, Poisson and Symplectic Geometry, Mathematical Physics, Classical and Quantum Field Theory, Topological Field Theory

EDUCATION

2013 **Ph.D. in Mathematics**
University of Zürich, Switzerland
Thesis: *Relational Symplectic Groupoids and Poisson Sigma Models with Boundary*
Advisor: Alberto Cattaneo

2009 **M.S. in Mathematics**
University of Utrecht, The Netherlands
Thesis: *Models for Formal Groupoids*
Advisors: Marius Crainic and Benoit Dherin

2008 **B.S. in Mathematics**
Universidad de los Andes, Colombia
Thesis: *Dirac Structures and Foliations in Lie Groups*
Advisor: Alexander Cardona

GRANTS

2014-2015 **Swiss National Science Foundation**
Advanced Postdoc Mobility Grant
PBZHP2-147294 (USD. 49,400)

2013-2014 **Swiss National Science Foundation**
Early Postdoc Mobility Grant
P300P2-154552 (USD. 67,200)

2012 **Forschungskredit Grant**
For Graduate Students at University of Zürich
No. 57103506 (USD. 45,000)

AWARDS AND HONORS

2018 **Illinois Geometry Lab Award for Undergraduate Research**
Second Place
Project: *Statistical Mechanics and Thermodynamics on Graphs and CW-Complexes*
University of Illinois, Urbana-Champaign

2017 **Illinois Geometry Lab Award for Undergraduate Research**
First Place
Project: *Quantum Mechanics on Graphs*
University of Illinois, Urbana-Champaign

2017 **Distinguished Teaching Award in Mathematics**
for Non-Tenure-Track Faculty
University of Illinois, Urbana-Champaign

2016-2018 Included in the **List of Teachers Ranked as Excellent by Their Students**
University of Illinois, Urbana Champaign
Spring 2016 , Summer 2016, Fall 2017, Spring 2018

2007-2008 **Mathematical Research Institute (MRI) Scholarship**
for the Master Class: *Aspects of Calabi-Yau Geometry*
University of Utrecht, The Netherlands

2006-2007 **Second and Third Prize**
International Mathematics Competition for University Students

2000-2003 **Silver Medal, Bronze Medal and Honorable Mention**
International Mathematics Olympiad, Ibero-american Mathematics Olympiad
Rio de la Plata Mathematics Olympiad

ACCEPTED PAPERS

1. *Genus Integration, Abelianization and Extended Monodromy*
with R. Fernandes, accepted (pending revisions) to International Mathematics Research Notices (IMRN) (2018)
(22 pages)

2. *The Graph Laplacian and Morse Inequalities*
with B. Xu, to appear in Pacific Journal of Mathematics (2018) (14 pages)

3. *Gluing of Graph Laplacians and Their Spectra*
with M. Toriyama and C. Yu, to appear in Linear and Multilinear Algebra (2018)
(30 pages)

4. *Poly-Poisson Sigma Models and their Relational Poly-Symplectic Groupoids*
with N. Martinez Alba, Journal of Mathematical Physics, Vol. 59, Issue 7 (2018)
(20 pages)

5. *A Functorial Construction for Quantum Subtheories*
with A. Duman, Entropy, Vol. 19, Issue 5, 220 (2017) (20 pages)

6. *Geometric Quantization and Epistemically Restricted Theories: The Continuous Case* with A. Duman, Electronic Procceedings in Theoretical Computer Science, Vol. 236 pp. 40–50 (2017)

7. *On the Geometry of Mixed States and the Fisher Information Tensor*
with E. Ercolessi and M. Schiavina, Journal of Mathematical Physics
Vol. 57, Issue 6 (2016) (23 pages)

8.*Relational Symplectic Groupoids*
with A. Cattaneo, Letters in Mathematical Physics, Vol. 105, Issue 5
pp. 723–767 (2015)

9. *Groupoids, Frobenius Algebras and Poisson Sigma Models*
Mathematical Aspects of Quantum Field Theories, Mathematical Physical Studies
Springer, Part III, pp. 413–427 (2015)

10.*Groupoids and Poisson Sigma Models with Boundary*
with A. Cattaneo, Geometric and Topological Methods for Quantum Field Theory
World Scientific, pp. 315–330 (2014)

11. *Models for Formal Groupoids*
Geometric and Topological Methods for Quantum Field Theory, Cambridge
University Press, pp. 322–339 (2013)

12. *Relative Frobenius Algebras are Groupoids*
with A. Cattaneo and C. Heunen, Journal of Pure and Applied Algebra, Vol. 217,
Issue 1, pp. 114–124 (2013)

PREPRINTS

1. *Split Canonical Relations*
with A. Cattaneo, submitted to Annales Henri Lebesgue (2018)

2. *Kähler Fibrations in Quantum Information Theory*
with M. Schiavina, submitted to Letters in Mathematical Physics (2018)

BOOKS (EDITOR)

1.*Geometric and Topological Methods for Quantum Field Theory*
with A. Cardona and A. Reyes-Lega, Cambridge University Press (2013)

2. *A Pathway through Algebra*
with J. Madroñero, Editorial Universidad Antonio Nariño (2007)

INVITED TALKS

Conferences

• *AMS Special Session on Latinx in Mathematics*
Joint Mathematical Meetings, Baltimore MD (January 2019)

• *AMS Special Session on Cluster Algebra, Poisson Geometry, and Related Topics*, AMS Sectional Meeting, Ann Arbor MI (October 2018)

• *AMS Special Session on Aspects of Geometric Mechanics and Dynamics*, AMS Sectional Meeting, Ann Arbor MI (October 2018)

• *Great Lakes Mathematical Physics Meeting*
Michigan State University (June 2018)

• *Higher Structures and Field Theories*
BIRS Conference, Oaxaca, Mexico (June 2017)

• *Gone Fishing Conference in Poisson Geometry*
University of Notre Dame (May 2107)

• *Mathematics for Students Conference*
Universidad de Los Andes, Colombia (November 2016)

• *Gone Fishing Conference in Poisson Geometry*
University of Colorado (March 2016)

• *Gone Fishing Conference in Poisson Geometry*
University of California, Berkeley (November 2014)

• *Derived Algebraic Geometry Winter School*
Flumsemberg, Switzerland (November 2013)

• *Colombian Congress of Mathematics*
Barranquilla, Colombia (July 2013)

• *Winter School in Mathematical Physics*
Les Diablerets, Switzerland (February 2013)

• *Winter School in Mathematical Physics*
Les Houges, Switzerland (February 2012)

• *ProDoc Meeting in Geometry, Algebra and Mathematical Physics*
ETH Zurich, Switzerland (November 2011)

• *Geometric, Algebraic and Topological Methods for Quantum Field Theory*
Villa de Leyva, Colombia (July 2011)

• *Geometric, Algebraic and Topological Methods for Quantum Field Theory*
Villa de Leyva, Colombia (July 2009)

Colloquium Talks

• *Colloquium Talk*, Smith College (February 2019)

• *Colloquium Talk*, Rutgers University, Newark (January 2019)

• *Colloquium Talk*, Mount Holyoke College (January 2019)

• *Colloquium Talk*, Bucknell University (January 2019)

• *Colloquium Talk*, University of Hartford (December 2018)

• *Colloquium Talk*, Union College (March 2018)

• *Beling Lecture*, Illinois Wesleyan University (September 2017)

• *Doob Colloquium*, University of Illinois, Urbana-Champaign (March 2017)

• *Zurich Graduate Colloquium*, ETH, Zurich (November 2013)

• *PhD Dissertation Colloquium*, University of Zurich (June 2013)

Invited Seminar Talks

• *Geometry and Topology Seminar*, University of Massachusetts, Amherst (September 2018)

• *Joint Symplectic and Poisson Seminar UIUC-WUSL*, Washington University in St. Louis (December 2017)

• *Representation Theory and Math-Physics Seminar*, University of California, Berkeley (November 2017)

• *Topology Seminar*, University of Notre Dame, South Bend IN (October 2016)

• *Symplectic and Poisson Geometry Seminar*, University of Illinois at Urbana-Champaign (February 2016)

• *Representation Theory and Geometry Seminar*, University of California, Berkeley (October 2015)

• *Winter School in Mathematical Physics*
Les Diablerets, Switzerland (February 2013)

• *Symplectic Geometry Seminar*, University of California, Berkeley
Berkeley CA (September 2015)

• *Oberseminar*, Max Planck Institute of Mathematics, Bonn, Germany (May 2015)

• *Northern California Symplectic Geometry Seminar* Berkeley CA (December 2014)

• *Talks in Mathematical Physics*, ETH Zurich, Switzerland (May 2014)

• *Non Commutative Geometry Seminar*, Athens University, Greece (March 2012)

TEACHING

Amherst College

Fall 2019	Instructor, *Introduction to Calculus*
	Instructor, *Graph Theory*
Spring 2019	Instructor, *Mathematical Reasoning and Proof*
	Instructor, *Lie Groups and Lie Algebras*
Fall 2018	Instructor, *Mathematical Reasoning and Proof*
	Instructor, *Introduction to Calculus*

	University of Illinois, Urbana-Champaign
Spring 2018	Instructor, *Applied Linear Algebra*
Summer 2017	Instructor, *Applied Linear Algebra*
Fall 2016	Instructor, *Applied Linear Algebra*
Spring 2016	Instructor, *Abstract Linear Algebra*
	University of California, Berkeley
Fall 2015	Instructor, *Abstract Algebra*
Summer 2015	Instructor, *Calculus and Analytic Geometry*
	University if Zurich, Switzerland
Fall 2012	Teaching Assistant, *Differentiable Manifolds*
Fall 2011	Teaching Assistant, *Analysis and Differential Equations*
Spring 2010	Teaching Assistant, *Differential Geometry*
Fall 2009, 2010	Teaching Assistant, *Linear Algebra for Physics*
	Universidad de los Andes, Colombia
Spring 2008	Instructor, *Differential Calculus*
Fall 2007	Teaching Assistant, *Calculus for Economics and Management*

ADVISING

Summer Undergraduate Research Fund (SURF), Amherst College

Summer 2019 Faculty mentor of the project:

- *Quantum Entropy and Graph Theory*

Illinois Scholars Undergraduate Research Program (ISUR), UIUC

2017-2018 Faculty mentor of the project:

- *A Novel Graph Laplacian Approach to Efficiently Computing Electronic Structures of Matter*

Illinois Geometry Lab (IGL), UIUC

2016-2018 Faculty mentor of the projects:

- *Quantum Mechanics on Graphs and CW-Complexes*
- *Statistical Mechanics and Thermodynamics on Graphs and CW-Complexes*
- *Poisson Geometry in Low Dimensions*

University Laboratory High School (Uni High), UIUC

Summer 2018 Faculty mentor of a group of three high school students on the project:

- *Dynamics on Fractals*

SERVICE

2017 Panelist for the AWM *Teaching Philosophy Statement Panel*
University of Illinois, Urbana-Champaign

2016-2018 Co-organizer of the Symplectic and Poisson Geometry Seminar
University of Illinois, Urbana-Champaign

2016-2018 Co-organizer and Co-founder of the Doob Colloquium
University of Illinois, Urbana-Champaign

2016 Co-organizer of the thematic session: *Geometric Structures in Mathematical Physics*
Fifth Latin-American Congress of Mathematics, Barranquilla, Colombia

2013 Coordinator (grader) of the LIV International Mathematics Olympiad, Colombia

2010-2013 Co-organizer of the Graduate Colloquium of Mathematics
University of Zürich and ETH, Switzerland

- Member of the American Mathematical Society (AMS) and the International Association of Mathematical Physics (IAMP)
- Math Alliance Mentor
- Referee for: Journal of Geometric Mechanics, Communications in Mathematical Physics, MDPI Mathematics, MDPI Entropy, SIGMA, Banach Center Publications, Physical Science International Journal, International Journal of Theoretical Physics
- Reviewer for Mathematical Reviews

PERSONAL

Citizenship: Colombian

Languages: English (Professional proficiency)

French, German and Romanian (Conversational)

Spanish (Native)