Sergio CHAVES

PERSONAL DATA

ADDRESS:	Department of Mathematics , Middlesex College.
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RESEARCH INTERESTS

My mathematical research is in the area of algebraic topology; more specifically, in equivariant cohomology, group cohomology, transformation groups and toric topology. I am interested in the algebraic invariants of topological spaces with a continuous action of compact Lie groups. In particular, exploiting the equivariant cohomology for group actions of non-connected Lie groups and extending results to toric topological spaces such as quasitoric manifolds, polyhedral products and Hamiltonian toric manifolds. My work is strongly related to other areas as differential geometry, commutative and homological algebra, algebraic geometry and combinatorics.

TEACHING INTERESTS

I perceive teaching as a process that goes beyond the classroom; it is a whole compendium of preparation, experience, motivation and philosophy that end up on the student's mindset towards the subject. I am aware of the responsibility to provide the best education to students. I encourage them to connect concepts with problems and applications, to think critically and participate actively in the classroom I fight against the stereotypes towards mathematics by combining the traditional pedagogical approaches with modern ways of communicating ideas. I am also interested in the deployment and development of open source tools to enhance student's learning experience (e.g. WebWork, GeoGebra, PreTeXT)

EDUCATION

JULY 2020	Doctor of Philosophy in MATHEMATICS, **The University of Western Ontario**, London, Ontario. Canada
MARCH 2013	Master of Science in MATHEMATICS, **Universidad de Los Andes**, Bogotá, Colombia.
APRIL 2011	Bachelor of Science in MATHEMATICS, **Universidad Nacional de Colombia**, Bogotá, Colombia.

SCHOLARSHIPS AND CERTIFICATES

- Correlation One - Data Science for All. Honours Certificate, Ministry of Technology. Colombia. DEC 2021.
- Western Science Teaching Fellowship. The University of Western Ontario. JULY 2020 - DEC. 2020.
- Long Term Visitor Fellowship. Fields Institute. Toronto, Ontario. JAN. 2020 - JUNE 2020.
- Western Certificate in University Teaching and Learning. The University of Western Ontario. 2019-2020.
- Western Graduate Research Scholarship. The University of Western Ontario. SEPT. 2015 - MAY 2020.
- Graduate Research Scholarship. Universidad de Los Andes. FEB. 2014 - JUNE. 2015.
- Research Scholarship for Masters studies. Universidad de Los Andes. FEB. 2011 - JAN. - 2013.
- Program of Special admission for outstanding students (tuition Waiver). Universidad Nacional de Colombia. FEB. 2007 - DEC. 2010.
- Yearly faculty of Science Award to students with the highest GPA. Universidad Nacional

de Colombia. 2007,2008, 2009, 2010.
- Colombian Olympiad in Mathematics. Undergraduate Category. Finalist. 2009.
- Colombian Olympiad in Mathematics. High-School Category. Finalist. 2006.

Workshops, Conferences and Remarkable Seminars

Participant

- International Polyhedral Products Seminar (Online). 2020-2021.
- Spring Graduate School on Polyhedral Products in Geometric Group Theory. Fields Institute (Online). Toronto. May 2020
- Workshop on Polyhedral Products in Geometric Group Theory. Fields Institute (Online). Toronto. May 2020.
- Workshop on Torus Actions in Topology. Fields Institute (online). May, 2020.
- Workshop on Polyhedral Products in Homotopy Theory. Fields Institute. Toronto. January, 2020.
- Winter Graduate School in Toric Topology. Fields Institute. Toronto. January, 2020.
- Brainhack Western 2019. (Winner of Innovative award for the proposed project on *How does the brain sound*).
- Graduate Student Seminar. (Also Organizer) Western University. 2019-2020. https://uwomathgrad.github.io/
- Sixteenth annual Graduate Student Topology and Geometry Conference. University of Illinois at Chicago. April 2018. (Travel stipend awarded).
- Forty-third annual NYS Graduate Student Conference. Syracuse University. March 2018. (Travel stipend awarded)
- Fifteenth annual Graduate Student Topology and Geometry Conference. Michigan State University. April 2017. (Travel stipend awarded)
- Workshop on Group Actions. Classical and Derived. Fields Institute, Toronto. June 2016. (Travel stipend awarded)
- Introduction to non-commutative geometry. Workshop. Universidad de Los Andes. 2014.
- Encounter in Interdisciplinary Mathematics. Universidad de Los Andes. 2013.
- Geometry and Topology Seminar. (Also Organizer). Universidad de Los Andes. Bogota. 2011-2012
- Category Theory Seminar. (Also Organizer). Universidad de Los Andes. Bogota. 2011-2012.
- Model Theory and O-Minimality. Workshop. Universidad Sergio Arboleda. Bogota. 2009.
- French Philosophy of Mathematics in the 20th Century. Couturat, Poincaré, Brunschvicg, Cavaillès, Lautman, Desanti,
- Châtelet, Petitot, Badiou. Conference. Universidad Nacional de Colombia. Bogota. 2009.
- Great Mathematical Currents of the 20th Century. Workshop. Universidad Nacional de Colombia. Bogota. 2008.
- Categorical Logic Workshop. Universidad Nacional de Colombia. Bogota.2007-2010.
- Piercian Studies Seminar. Universidad Nacional de Colombia. Bogota. 2007-2010

Speaker

- Equivariant Cohomology for semi-direct products. Graduate Student Geometry and Topology Conference. Apr. 2020. (Travel stipend awarded)
- Homotopy geistenhaber algebras as strongly homotopy commutative algebras. Homogeneous spaces learning seminar. Oct. 2019
- Equivariant Cohomology of $\mathbb{Z}/2$-manifolds - Inauguration talk of the Graduate Student Seminar. Sep. 2019.
- Equivariant cohomology: a Topological and an algebraic approach- Forty-Fourth

Annual New York State Graduate Student Conference. Syracuse University. APRIL 2019. (Travel stipend awarded)

- ON THE AUTOMORPHISM GROUP OF RIEMANN SURFACES. Riemann surfaces learning seminar. JULY 2018.
- EQUIVARIANT COHOMOLOGY FOR TORUS ACTION WITH A COMPATIBLE INVOLUTION. Graduate Student conference in Algebra and Topology. Temple University. Philadelphia. JUNE 2018. (Travel stipend awarded)
- SYZYGIES IN EQUIVARIANT COHOMOLOGY FOR TORUS ACTIONS. Public Lecture. University of Western Ontario. MAY 2018.
- FREENESS OF THE EQUIVARIANT COHOMOLOGY AS A $H^*(BG)$-MODULE. Graduate Students Seminar. University of Western Ontario. FEB. 2018.
- THE BOREL CONSTRUCTION AND THE EQUIVARIANT COHOMOLOGY. Colloquium. Universidad Javeriana. Bogota. AUG. 2016.
- CONJUGATION SPACES. Geometry and Topology Seminar. Universidad de Los Andes. Bogota. JULY 2016.
- CONJUGATION SPACES. Public Lecture. *Requirement to successfully approve the Comprehensive examination.* University of Western Ontario. JUNE 2016.
- INTRODUCTION TO BOREL EQUIVARIANT COHOMOLOGY. Mini-seminar in Equivariant cohomology. University of Western Ontario. FEB. 2016.
- GEODESICS AND RICCI FLOW. Learning seminar on Riemannian Geometry. Universidad de Los Andes. APR. 2015.
- COMPUTATIONS USING SPECTRAL SEQUENCES. Learning seminar on Rational homotopy theory. Universidad de los Andes. SEP. 2014.
- COBORDISM AND HOMOTOPY GROUP OF SPHERES. Public Lecture. *Master thesis defense.* Nov. 2012
- CURVATURE ON MANIFOLDS. Geometry and Topology seminar. Universidad de Los Andes. OCT. 2012.
- INTRODUCTION TO MODEL CATEGORIES. Category theory seminar. Universidad de Los Andes. SEP. 2011.
- CATEGORICAL REPRESENTATION OF BANACH SPACES. Analysis seminar. Universidad Nacional de Colombia. Nov. 2010.

WORK EXPERIENCE

DEC. 2020 JUL. 2020	Student Teaching Fellow *The University of Western Ontario.* London, ON.
MAY. 2020 SEP. 2015	Graduate Teaching and Research assistant *The University of Western Ontario.* London, ON.
JUN. 2015 JAN. 2014	Graduate Teaching and Research assistant *Universidad de Los Andes.* Bogotá.
DEC. 2013 JAN. 2013	Lecturer *Universidad de Los Andes.* Bogotá. *Universidad del Rosario* Bogotá. *Universidad Central de Colombia* Bogotá.
DEC. 2012 JAN. 2011	Graduate Teaching and Research assistant *Universidad de Los Andes.* Bogotá.

Teaching Experience

University of Western Ontario	Mathematics 0110A (Introduction to Calculus)
	Calculus 1000A (Calculus I)
	Mathematics 1120 (Fundamental Concepts in Mathematics)
	Mathematics 1228 (Methods of Finite Mathematics)
	Mathematics 1229 (Methods of Matrix Algebra)
	Mathematics 1600 (Linear Algebra)
	Calculus 1501 (Calculus II)
	Mathematics 2120* (Intermediate Linear Algebra)
	Mathematics 2151 (Discrete Structures for Engineering)
	Mathematics 2155 (Mathematical Structures)
	Calculus 2302A* (Intermediate Calculus)
	Mathematics 3020* (Introduction to Abstract Algebra)
	Mathematics 3124* (Complex Analysis)
	Mathematics 3159* (Introduction to Cryptography)
	Mathematics 4123 (Rings and Modules)
Universidad de Los Andes	Integral Calculus and Differential Equations
	Vector Calculus
	Biomathematics - *Mathematics for Medicine and Biology*
	Differential Calculus and Introduction to Integration*
	Numerical Analysis and Calculus in Complex Variables*
Universidad del Rosario	Introduction to Probability
	Matrix Algebra
	Linear Programming and Optimization
Universidad Central de Colombia	Mathematical Logic
	Differential Calculus
	Integral Calculus
	Vector Calculus
	Linear Algebra

As a senior Teaching Assistant, I was in charge of supervise, organize and train junior TA's and help them to get familiar with the duties. I have been a participant of the *Directed Reading Program* at Western University mentoring undergraduate students into interesting mathematical projects. I also volunteered to teach basic Spanish to undergraduate students travelling to Central and South America countries under the impact experience program.

Academic References

Research References

- Matthias Franz - Associate Professor (mfranz@uwo.ca)
- Masoud Khalkhali - Professor (masoud@uwo.ca)
- Ján Mináč - Professor (minac@uwo.ca)

Teaching References

- Nicole Lemire - Associate Professor, Associate Chair (nlemire@uwo.ca)
- David Michael Riley - Professor (DMRiley@uwo.ca)

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*Main teaching assistant role was to grade assignments/exams and provide office hours.

Publications, Documents and Preprints

- *The equivariant cohomology for semidirect product actions.* arXiv Preprint, 2020. (Submitted)
- *The quotient criterion in equivariant cohomology for elementary 2-abelian group actions.* arXiv Preprint, 2020. (Submitted)
- *Equivariant cohomology for 2-torus actions and torus actions with compatible involutions.* Doctoral dissertation, 2020.
- *Duistermaat's Theorem on cohomologically symplectic spaces.* 2019 Manuscript.
- *On the automorphism group of Riemann surfaces.* 2018. Manuscript
- *About The Lyndon-Hochschild-Serre Spectral Sequence.* 2017. Manuscript
- *Computations on Equivariant Cohomology.* 2016. Manuscript.
- *Clifford Algebras and Milnor's Conjecture for $n = 2$.* 2016. Manuscript
- *Cobordism and Group of Homotopy spheres.* 2012. Master degree dissertation.

These documents can be accessed in my website here.