

Sergio CHAVES

PERSONAL DATA

ADDRESS: Department of Mathematics , Middlesex College.
The University of Western Ontario.
London, Ontario. Canada, N6A 5B7.
PHONE: 519-661-2111 x86539 ☎.
EMAIL: schavesr@uwo.ca ✉.

RESEARCH INTERESTS

My mathematical research is in equivariant cohomology; more specifically, algebraic invariants of topological spaces with a continuous action of a topological group. For such a class of spaces, there is a canonical algebraic structure which inherits a structure of graded module over the cohomology ring of the classifying space of the acting group. It turns out that properties of the action are closely related to properties of this module, and vice-versa. Therefore, my work is strongly based on tools from algebraic topology, transformation groups, differential geometry, symplectic geometry, toric topology and commutative and homological algebra.

EDUCATION

IN PROGRESS 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

- Long Term Visitor Fellowship. Fields Institute. Toronto, Ontario. JAN. 2020 - MAY 2020.
- Western Certificate in University Teaching and Learning. The University of Western Ontario. 2019- TO DATE.
- Western Graduate Research Scholarship. The University of Western Ontario. SEPT. 2015 - TO DATE.
- 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

- Thematic Program on Toric Topology and Polyhedral Products. Fields Institute. Toronto. January - May, 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

- 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

CURRENT SEP. 2015	Graduate Teaching and Research assistant <i>The University of Western Ontario</i> . London, ON.
JUN. 2015 JAN. 2014	Graduate Teaching and Research assistant <i>Universidad de Los Andes</i> . Bogotá.
DEC. 2013 JAN. 2013	Lecturer <i>Universidad de Los Andes</i> . Bogotá. <i>Universidad del Rosario</i> Bogotá. <i>Universidad Central de Colombia</i> Bogotá.
DEC. 2012 JAN. 2011	Graduate Teaching and Research assistant <i>Universidad de Los Andes</i> . Bogotá.
Dec. 2010 JAN. 2010	Academic Tutor <i>Universidad Nacional de Colombia</i> . 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 1301 (Calculus II) Calculus 1501 (Calculus II) Mathematics 2120* (Intermediate Linear Algebra) Calculus 2302A* (Intermediate Calculus) Mathematics 3020* (Introduction to Abstract Algebra) Mathematics 3124* (Complex Analysis) Mathematics 3159* (Introduction to Cryptography)
UNIVERSIDAD DE LOS ANDES	Integral Calculus and Differential Equations Vector Calculus Biomathematics - <i>Mathematics for Medicine and Biology</i>
UNIVERSIDAD DEL ROSARIO	Introduction to Probability Matrix Algebra
UNIVERSIDAD CENTRAL DE COLOMBIA	Mathematical Logic Differential Calculus Integral Calculus Vector Calculus Linear Algebra

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](#).

PUBLICATIONS, DOCUMENTS AND PREPRINTS

- *Equivariant cohomology for 2-torus actions with mod 2 coefficients*. 2020. Doctoral dissertation.
- *Equivariant cohomology of spaces with torus actions and compatible involutions*. In preparation, to appear in ArXiv in early 2020.
- *The quotient criterion in equivariant cohomology for 2-torus actions*. In preparation, to appear in ArXiv in early 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.

*Main teaching assistant role was grading and provide office hours.