

José María Cantarero López

Curriculum Vitae

Education

- 2004–2009 **Ph.D. in Mathematics**, *University of British Columbia*, Vancouver, Canada
Thesis: Equivariant K-theory, groupoids and proper actions
Supervisor: Alejandro Adem
- 2000–2004 **B.Sc. in Mathematics**, *Universidad de Málaga*, Spain

Employment

- 2022– **Tenure track researcher A**, *Centro de Investigación en Matemáticas A.C. (CIMAT)*, Unidad Mérida, México
- 2014–2022 **CONACYT Research Fellow**, *Mexican Council of Science and Technology*, Mexico
Commissioned to CIMAT, Unidad Mérida.
- 2013–2014 **Postdoctoral Researcher**, *CIMAT*, Guanajuato, Mexico
- 2011–2012 **Szegő Assistant Professor**, *Stanford University*, Stanford, USA
- 2010–2011 **Samelson Postdoctoral Fellow**, *Stanford University*, Stanford, USA
- 2009–2010 **Postdoctoral Fellow**, *Centre de Recerca Matemàtica*, Bellaterra, Spain

Visiting positions

- 2013 **Københavns Universitet**, *Copenhagen*, Denmark, 2 months
- 2012–2013 **CIMAT**, *Guanajuato*, Mexico, 7 months

Publications

Uniqueness of factorization for fusion-preserving representations, with G. Combariza, To appear in *Comm. Algebra*

A completion theorem for fusion systems, with N. Bárcenas, *Israel J. Math.* 236, 501-531 (2020)

Vector bundles over classifying spaces of p -local finite groups and Benson-Carlson duality, with N. Castellana and L. Morales, *J. Lond. Math. Soc.* (2) 101 (2020), no. 1, 1-22

Twisted equivariant K-theory of compact Lie group actions with maximal rank isotropy, with A. Adem and J. M. Gómez, *J. Math. Phys.* 59, 113502 (2018)

Unitary embeddings of finite loop spaces, with N. Castellana, *Forum Math.* 29 (2017), no. 2, 287-311

Nilpotent p -local finite groups, with J. Scherer and A. Viruel, *Ark. Mat.* 52 (2014), no. 2, 203-225

Centro de Investigación en Matemáticas, A.C., Unidad Mérida
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Equivariant K-theory, groupoids and proper actions, *J. K-theory* 9 (2012), no. 3, 475-501

Twisted K-theory for actions of Lie groupoids and its completion theorem, *Math. Z.* 268 (2011), no. 1-2, 559-583

Submitted

Fusion-invariant representations for symmetric groups, *con J. Gaspar*, ArXiv 2305.17587

On the cohomological triviality of the center of the Frattini subgroup, *with J. Calles, J. O. Gómez and G. Ortega*, ArXiv 2211.00865

Configuration spaces of commuting elements, *with A. R. Jiménez*, ArXiv 2201.03177

Research grants

2023– **Principal Investigator**, *CONAHCYT CF-2023-I-2649: Hidden symmetries in algebra and topology*

2015–2019 **Principal Investigator**, *SEP-CONACYT 242186: Homotopical aspects of compact Lie groups*

Organization of conferences

2023 **Meeting of mathematics graduate programs UADY-CIMAT**, *with F. J. Hernández, R. Legarda, A. Martín and J. M. Navarro*, CIMAT Mérida

2022 **Special session Groups and Topology of the II Joint meeting RSME-UMA**, *with A. Díaz and K. Piterman*, Ronda, Spain

New trends in Algebra, Geometry and Homotopy Theory, a conference in honor of Alejandro Adem's 60th birthday, *with O. Antolín, J. M. Gómez, D. Juan, E. Lupercio, B. Uribe and B. Williams*, CIMAT Mérida

CIMAT-UADY Topology meeting, *with J. P. Navarrete*, UADY

Astronomy is always interesting, *with J. E. Pérez*, CIMAT Mérida

2020 **Algebraic and Geometric Topology session of the Virtual National Congress of the Mexican Mathematical Society**, *with R. Jiménez*

2019 **Summer school 2019 at CIMAT Merida**, CIMAT Mérida

Session Algebra and Topology at the Jornadas de Topología, *with O. Antolín and I. Sánchez*, Universidad Juárez del Estado de Durango

2018 **CIMPA school Noncommutative Geometry and Index Theory**, *with N. Bárcenas and P. Carrillo*, CIMAT Mérida

Thematic session Algebraic Topology at the Meeting of mathematical societies of Colombia and Mexico, *with M. Velásquez*, Universidad del Norte

2017 **Winter School on Algebraic Topology 2017**, *with M. Hill*, CIMAT Mérida

Cohomology of Groups special session of the Mathematical Congress of the Americas 2017, *with E. M. Friedlander and T. B. Williams*, McGill University

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- 2016 **Algebraic Topology session of the XLIX National Congress of the Mexican Mathematical Society**, with *R. Jiménez*, Universidad Autónoma de Aguascalientes
- Meeting on Topological K-theory and Noncommutative Geometry**, with *N. Bárcenas*, CIMAT Mérida
- 2015 **Algebraic Topology session of the XLVIII National Congress of the Mexican Mathematical Society**, with *R. Jiménez*, Universidad de Sonora
- 2014 **MSRI Summer School in Algebraic Topology**, with *M. Hill*, CIMAT

Editorial service

- 2019–2021 **Editor**, *Abstraction & Application*
- 2018– **Reviewer**, *Zentralblatt MATH*, 12 reviews
- 2015– **Reviewer**, *MathSciNet Mathematical Reviews*, 29 reviews

Supervision of postdoctoral researchers

- 2023– **Mario Fuentes Rumí**, *CIMAT*
- 2022– **Jose Luis León Medina**, *CIMAT*
- 2022– **Bernardo Villarreal Herrera**, *CIMAT*
- 2017 **Bárbara Mayela Gutiérrez Mejía**, *CIMAT*

Supervision of theses

Ph.D.

- 2023 **Víctor Antonio Torres Castillo**, *co-supervised with J. Scherer*, CIMAT
Thesis: Biset functors and the homotopy type of the classifying spectra of saturated fusion systems
- 2023 **Juan Omar Gómez Rodríguez**, CIMAT
Thesis: On the Picard group of the stable module category for infinite groups
- 2022 **Alffer Gustavo Hernández Posada**, *co-supervised with F. Ferrari*, Universidade Federal de São Carlos, Brazil
Thesis: Twisted Borel K-theory and isomorphisms between differential models of K-theory

M.Sc.

- 2022 **Gustavo Navarrete Novelo**, *co-supervised with J. M. Navarro*, UADY
Thesis: T-duality in equivariant K-theory
- 2019 **Ángel Rolando Jiménez Cruz**, *co-supervised with J. M. Navarro*, UADY
Thesis: Invariants of configuration spaces of commuting elements
- 2017 **Arfaxard Sánchez Estrella**, *co-supervised with J. A. Díaz*, UADY
Thesis: Transfer maps for finite transporter categories
- 2016 **Margarita Angélica Martínez López**, *co-supervised with H. Kanarek*, CIMAT
Thesis: Homological invariants of EI categories

B.Sc.

- 2020 **Jorge Eduardo Gaspar Lara**, UNAM
Thesis: K-theory and fusion-invariant representations
Winner of the 2021 Sotero Prieto Award
- 2016 **Antonio González Fernández**, *co-supervised with J. E. Pérez*, UADY
Thesis: Fusion systems for groups, actions and representations
- 2013 **Joseph Victor**, *co-supervised with G. Carlsson*, Stanford University
Thesis: Stable homotopy groups of spheres and the Hopf invariant one problem
Winner of an Undergraduate Research Award 2013 of the department of mathematics of Stanford University

Current students

- Víctor Adrián Meza Campa**, B.Sc., Universidad Autónoma de Sinaloa
- José María Castilla Cochegrus**, B.Sc., Universidad Autónoma de Yucatán
- Gabriel Longatto Clemente**, *in co-supervision with F. Ferrari*, Ph.D., Universidade Federal de São Carlos
- Paul Quispe Cutipa**, *in co-supervision with R. M. Mamani*, B.Sc., Universidad Nacional de San Agustín de Arequipa, Perú
Thesis: Smith theory and an introduction to Casacuberta-Dicks' conjecture

Teaching

- 2023 **MAT. 310: Selected topics in fibre bundles and characteristic classes**, *Ph.D. program*, Universidade Federal de São Carlos
Selected topics in topology II: Homology and cohomology, *M.Sc. program*, CIMAT/Universidad Autónoma de Chiapas
- 2022 **Modern algebra**, *M.Sc. program*, CIMAT
Equivariant homotopy, *M.Sc. program*, UADY
- 2021 **Fiber bundles and classifying spaces**, *M.Sc. program*, UADY
Selected topics in topology III: Localization in algebra and topology, *Ph.D. program*, CIMAT
Homology and cohomology, *M.Sc. program*, UADY
- 2020 **Selected topics in algebra I: Representation theory of finite groups**, *Ph.D. program*, CIMAT, with J. E. Pérez
Selected topics in topology II: Group cohomology and classifying spaces, *Ph.D. program*, CIMAT
Topology II, *B.Sc. program*, UADY
- 2019 **Selected topics in topology I: Algebraic topology**, *Ph.D. program*, CIMAT
Calculus and vector analysis, *B.Sc. program*, UADY, with J. Lugo
Cohomology of groups and classifying spaces, *M.Sc. program*, UADY
- 2018 **Selected topics in algebraic topology**, *M.Sc. program*, UADY
Homotopy theory, *M.Sc. program*, UADY

- 2017 **Geometry of discrete groups**, *B.Sc. program*, UADY
Fiber bundles and K-theory, *M.Sc. program*, UADY
- 2016 **Topics in homotopy theory**, *M.Sc. program*, UADY
Topology II, *B.Sc. program*, UADY
Methods of homotopy theory, *M.Sc. program*, UADY
Homotopy theory, *B.Sc. program*, UADY
- 2015 **Topology II**, *B.Sc. program*, UADY
Homotopy theory, *B.Sc. program*, UADY
- 2014 **Topology II**, *B.Sc. program*, UADY
Topology I, *M.Sc. program*, CIMAT
- 2012 **MATH 215b: Algebraic topology**, *Ph.D. program*, Stanford University
MATH 283: Cohomology of finite groups, *Ph.D. program*, Stanford University
- 2011 **MATH 41: Differential and integral calculus of functions of one variable**,
Instructor for 2 sections and coordinator, *B.Sc. program*, Stanford University
MATH 19: Differential calculus of functions of one variable, *B.Sc. program*,
Stanford University
MATH 215b: Algebraic topology, *Ph.D. program*, Stanford University
- 2010 **MATH 41: Differential and integral calculus of functions of one variable**,
Instructor for 2 sections, *B.Sc. program*, Stanford University
- 2008 **MATH 104: Differential calculus with applications to commerce and social
sciences**, *B.Sc. program*, University of British Columbia
- 2004–2009 **Calculus, Linear Algebra and Applied Linear Algebra**, *Teaching Assistant*, *B.Sc.*
program, University of British Columbia

Organization of seminars

- 2015– **Algebraic Topology Seminar**, *CIMAT Mérida*
2012–2014 **Algebraic Topology Seminar**, *CIMAT*
2010–2012 **Topology Progress Seminar**, *Stanford University*
2006–2007 **Learning Seminar in Topology**, *University of British Columbia*

Awards, fellowships and honors

- 2020– **Tutor for the M.Sc. and Ph.D. programs in algebra and topology**, *UNAM*
2014– **Member of CONACYT Registry of Accredited Evaluators (RCEA)**
2014– **Member of the National System of Researchers in Mexico (SNI), level I**
2014–2022 **CONACYT Fellowship**, *awarded by the Mexican Council of Science and Technology*

Service positions and participation in committees

- 2023 **Admission committee for M.Sc. in pure mathematics program**, *CIMAT*
2023 **Acting director for CIMAT Mérida**, *January 13th–26th*

- 2020– **Ph.D. tutoring committee**, *UNAM*, Porfirio Leandro León Álvarez
Committee for the algebra qualifying exam, *CIMAT*, January 2014, August 2022, January 2023
Committee for the topology qualifying exam, *CIMAT*, July 2014
Thesis jury, 2 at *B.Sc. level*, 5 at *M.Sc. level*, 7 at *Ph.D. level*
Thesis jury member and evaluator, not including my own students

Professional memberships

- 2023– **Member**, *Registry of researchers, technologists and science liaisons of the state of Yucatan*
2019– **Member**, *Mexican Mathematical Society*
2017– **Affiliate member**, *American Mathematical Society*

Mentorship for programs of introduction to research

- 2023 **Delfín program (summer research program for undergraduates)**, 2 students
2019 **Delfín program**, 2 students
2018 **Delfín program**, 1 student
XXVIII Scientific Research Summer, *Mexican Academy of Sciences*, 2 students
2014 **XXIV Scientific Research Summer**, *Mexican Academy of Sciences*, 1 student

Invited conference lectures

- 2023 **Geometric twistings for Borel equivariant K-theory**, *Iberoamerican and Pan Pacific International Conference on Topology and its Applications*, Benemérita Universidad Autónoma de Puebla, Puebla, Mexico
How to study symmetry with algebraic topology, *Summer school 2023 at CIMAT Mérida*
Geometric twistings for Borel equivariant K-theory, *Equivariant bordism theory and applications*, Casa Matemática Oaxaca
Computations in twisted K-theory, *II Colloquium of academic bodies and research groups*, REMIM
Group actions via homotopy theory, *First Physics and Mathematics Seminar*, Escuela Superior de Matemáticas de la Universidad Autónoma de Guerrero
2022 **Geometric twistings and twisted Borel equivariant K-theory**, *CIMAT-UADY Topology Meeting*, UADY
Minicourse A local vision of finite groups, *Summer school 2022 at CIMAT Mérida*
About Schmid's conjecture, *Algebra Conference 2022*, UADY
2021 **Minicourse Classifying spaces**, *Emalca Virtual Arequipa-Peru 2021*, Universidad Nacional de San Agustín de Arequipa, Arequipa, Peru

- Uniqueness of decomposition of fusion-invariant representations**, *54 National Congress of the Mexican Mathematical Society*, Benemérita Universidad Autónoma de Puebla
- Decompositions of fusion-invariant representations**, *Summer school 2021 at CIMAT*
- 2020 **Minicourse A local vision of finite groups**, *Summer school 2020 at CIMAT Mérida*
- 2019 **Twisted K-theory of p-local finite groups**, *Samuel Gitler conferences 2019*, Samuel Gitler collaboration center, Mexico City
- 2018 **A completion theorem for p-local finite groups**, *LI National Congress of the Mexican Mathematical Society*, Universidad Juárez Autónoma de Tabasco, Villahermosa, Mexico
- Minicourse Limits and colimits**, *Algebra Conference 2018*, UADY
- Homotopical group theory**, *Second meeting of young researchers in mathematics (IM-UNAM)*, Universidad Nacional Autónoma de México, Mexico City
- 2017 **Benson-Carlson duality for p-local finite groups**, *Mathematical Congress of the Americas 2017*, McGill University, Montreal, Canada
- 2016 **Representations of fusion systems**, *XLIX National Congress of the Mexican Mathematical Society*, Universidad Autónoma de Aguascalientes, Mexico
- Representations of fusion systems**, *Samuel Gitler's 2016 Conferences*, Centro de Investigación y Estudios Avanzados del IPN (CINVESTAV), Mexico City
- Unitary embeddings of finite loop spaces**, *Meeting on topology, geometry and representation theory*, Universidad Nacional de Colombia, Medellín, Colombia
- Representations of fusion systems**, *V Latin American Congress of Mathematicians*, Universidad del Norte, Barranquilla, Colombia
- Representations of fusion systems**, *Algebra Conference 2016*, UADY
- 2015 **Twisted equivariant K-theory and maximal rank isotropy**, *XLVIII National Congress of the Mexican Mathematical Society*, Universidad de Sonora, Hermosillo, Mexico
- 2014 **From compact Lie groups to p-compact groups**, *Young Researchers' Meeting*, CIMAT
- From compact Lie groups to p-compact groups**, *XLVII National Congress of the Mexican Mathematical Society*, Universidad Juárez del Estado de Durango, Durango, Mexico
- Minicourse Introduction to Algebraic Topology**, *Workshop on Algebra, Algebraic Geometry, Algebraic Topology and Applications*, Universidad de Ciego de Ávila, Cuba
- Minicourse Homotopical Group Theory**, *MSRI Summer School in Algebraic Topology*, CIMAT
- 2013 **p-compact groups and p-local H-spaces**, *Differential Geometry at CIMAT*

- The orbit space of a p-local compact group**, *Mathematical Congress of the Americas*, CIMAT
- 2012 **The orbit space of p-compact groups**, *XLV National Congress of the Mexican Mathematical Society*, Universidad Autónoma de Querétaro, Mexico
- 2010 **Completion theorems for groupoid actions**, *Topologists from Málaga around the world*, Universidad de Málaga
- 2009 **Twisted K-theory and groupoids**, *Cascade topology seminar*, University of British Columbia
- 2008 **Equivariant K-theory, groupoids and proper actions**, *Fall Western Section Meeting of the AMS*, University of British Columbia
- Equivariant K-theory, groupoids and proper actions**, *Second Canada-France congress*, Université du Québec, Montreal

Invited seminar lectures

- 2023 **A vision of symmetry through classifying spaces**, *Colloquium of the Mexican Mathematical Society*
- Configuration spaces of commuting elements**, *Algebraic and geometric topology seminar*, UNAM/Universidad Católica de Chile
- 2022 **Simmetries, equivariant homotopy and Borel equivariant K-theory**, *CIMAT-DEMAT Colloquium*
- Configuration spaces of commuting elements**, *Topology and applications Seminar*, CINVESTAV
- Configuration spaces of commuting elements**, *Purdue Topology Seminar*, Purdue University, USA
- 2021 **The twisted K-theory of p-completed classifying spaces**, *Topology Seminar*, Instituto de Matemáticas, UNAM Oaxaca, Mexico
- The twisted K-theory of p-completed classifying spaces**, *EPFL Topology Seminar*, École Polytechnique Fédérale de Lausanne, Switzerland
- 2020 **An introduction to the local study of topological spaces**, *Virtual algebraic topology seminar*, CIMAT Mérida
- 2019 **In how many ways can you comb a coconut?**, *FMAT-CIMAT Colloquium*, UADY
- Linearly independent tangent fields over spheres**, Universidad Nacional de Colombia, Bogotá, Colombia
- The twisted K-theory of p-completed classifying spaces**, Pontificia Universidad Javeriana, Bogotá, Colombia
- 2018 **Invariants of spaces of homomorphisms to Lie groups**, *Geometry and topology seminar*, Universidad de Málaga
- Invariants of spaces of homomorphisms to Lie groups**, *Geometry and topology seminar*, IM-UNAM, Oaxaca, Mexico
- Invariants of spaces of homomorphisms to Lie groups**, *GAP Seminar*, Pennsylvania State University, State College, USA

- 2017 **Homotopical group theory**, *Colloquium of pure mathematics*, Universidad Autónoma de Zacatecas, Mexico
Benson-Carlson duality for p -local finite groups, *Seminar of the faculty of sciences*, Universidad de Colima, Mexico
Group actions via homotopy theory, *Colloquium of physics and mathematics*, Universidad de Colima
- 2016 **Representations of fusion systems**, *FMAT-CIMAT Colloquium*, UADY
- 2014 **From compact Lie groups to p -compact groups**, *FMAT-CIMAT Colloquium*, UADY
Compact Lie groups, p -compact groups and p -local H-spaces, *Topology Seminar*, University of British Columbia
- 2013 **Minicourse on p -local groups**, *Topology Seminar*, Universidad Nacional Autónoma de México (UNAM), Morelia, Mexico
Unitary embeddings of finite loop spaces, *Topology Seminar*, Johns Hopkins University, Baltimore, USA
Unitary embeddings of finite loop spaces, *Topology Seminar*, Københavns Universitet
- 2012 **The p -local study of groups and topological spaces**, *Colloquium*, CIMAT
The orbit space of a p -compact group, *Algebraic Topology Seminar*, Universitat Autònoma de Barcelona, Bellaterra, Spain
Nilpotent p -local finite groups, *Topology Seminar*, Københavns Universitet
- 2011 **Nilpotent p -local finite groups**, *Algebraic Topology Seminar*, Universitat Autònoma de Barcelona
Combinatorial models for p -completions of compact Lie groups, *Topology Seminar*, University of British Columbia
Combinatorial models for p -completions of compact Lie groups, *Topology Seminar*, Stanford University
- 2009 **Groupoid actions and equivariant K-theory**, *Algebraic Topology Seminar*, Universitat Autònoma de Barcelona
The equivariant nature of groupoids, *Algebraic Topology Seminar*, Universität Münster, Germany
The equivariant nature of groupoids, *Algebraic Topology Seminar*, Universität Düsseldorf, Germany
- 2008 **Equivariant K-theory, groupoids and proper actions**, *Algebra/Algebraic Topology Seminar*, University of British Columbia
The completion theorem for groupoids, *Algebra/Algebraic Topology Seminar*, University of British Columbia
- 2007 **Equivariant K-theory for actions of loop groups**, *Algebra/Algebraic Topology Seminar*, University of British Columbia

Science popularization

- 2023 **Workshop “The Möbius band”**, *Primary school Lázaro Cárdenas del Río*
- 2022 **Lecture “The Euler characteristic”**, *CIMAT Mérida*, Visit from the State Secondary School no. 45 “Carmen Cervera Andrade”
- 2019 **Lecture “Deformations of geometric figures”**, *CIMAT Mérida*, Visit of high school students from the Universidad del Valle de Grijalba
- 2018 **Interview “Topological applications to data science and robotics”**, *Television program Inngenio Viral*, Secretaría de investigación, innovación y educación superior, <https://youtu.be/N-Wa45kt7J4>
- 2013 **Lecture “Deformations of geometric figures”**, *Escuela de Nivel Medio Superior de la Universidad de Guanajuato*