

## Curriculum Vitae

Bernardo Villarreal Herrera

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### Education

2013 - 2017 *PhD Mathematics, University of British Columbia (UBC), Vancouver, British Columbia, Canada.*

Supervisor: Alejandro Adem.

2010 - 2012 *Maestría en Ciencias Matemáticas, Universidad Nacional Autónoma de México<sup>1</sup> (UNAM), Mexico City, Mexico.*

2005 - 2011 *Matemáticas, UNAM, Mexico City, Mexico.*

### Academic Positions

2022 - pres. *Investigador Asociado C, Centro de Investigación en Matemáticas (CIMAT)<sup>2</sup>, Mérida, Yuc, Mexico.*

2020 - 2022 *Posdoc DGAPA, Instituto de Matemáticas (IM) UNAM, Mexico City, Mexico.*

2019 - 2020 *Postdoc, Københavns Universitet<sup>3</sup> (KU), Copenhagen, Denmark.*

2018 - 2019 *Posdoc FORDECYT, IM–UNAM, Mexico City, Mexico.*

2017 - 2018 *Postdoctoral Fellow, Indiana University–Purdue University Indianapolis (IUPUI), Indianapolis, Indiana, US.*

### Awards and Scholarships

2023 - 2027 CONACYT<sup>4</sup> *Sistema Nacional de Investigadores Nivel 1.* Award payable when in a full-time position in Mexico.

2019 - 2020 CONACYT *Beca de Posdoc en el Extranjero.* 2,000 USD monthly stipend to be used while a postdoc at KU, mentored by Søren Galatius.

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<sup>1</sup>National Autonomous University of Mexico

<sup>2</sup>Center for Research in Mathematics

<sup>3</sup>The University of Copenhagen.

<sup>4</sup>Mexican National Science and Technology Council.

2013 - 2017 CONACYT *Beca de Doctorado en el Extranjero*. 1,100 USD monthly stipend plus tuition while a graduate student at UBC, supervised by Alejandro Adem.

## Papers and Preprints

### Preprints

- The complex of affinely commutative sets, with O. Antolín-Camarena. arXiv:1906.07205, preprint 2019.

### Papers

- On the second homotopy group of the classifying space for commutativity in Lie groups. *Geom. Dedicata* **217** (2023), no. 3, article 51.
- On families of nilpotent subgroups and associated coset posets, with S. Gritschacher. *J. Homotopy Relat. Str.* **17** (2022), no. 4, 493–509.
- Higher generation by abelian subgroups in Lie groups, with O. Antolín-Camarena and S. Gritschacher. *Transform. Groups* (2021), 1–16. doi.org/10.1007/s00031-021-09659-8.
- Nilpotent  $n$ -tuples in  $SU(2)$ , with O. Antolín-Camarena. *Proc. Edinburgh Math. Soc.* **63** (2020), no. 4, 1005–1030.
- Classifying spaces for commutativity in low-dimensional Lie groups, with O. Antolín-Camarena and S. Gritschacher. *Math. Proc. Cambridge Philos. Soc.* **169** (2020), no. 3, 433–478.
- Commutative cocycles and stable bundles over surfaces, with D. A. Ramras. *Forum Math.* **31** (2019), no. 6, 1395–1415.
- Cosimplicial groups and spaces of homomorphisms. *Algebr. Geom. Topol.* **17** (2017), no. 6, 3519–3545.

### PhD Thesis

- A simplicial approach to spaces of homomorphisms, *cIRcle UBC*, 2017.

## Teaching

### Graduate courses

*CIMAT-UNACH*

Jan - May 2023 Homological Algebra.

*Institut for Matematiske Fag, KU*

Apr - Jun 2020 Algebraic Topology 2 (with Piotr Pstragowski).

### Undergraduate courses

*Departamento de Matemáticas, Facultad de Ciencias, UNAM*

Mar - Jun 2021 Topics in Algebra.

Aug - Dec 2018 Topics in Algebra.

*Department of Mathematical Sciences, IUPUI*

May - Jun 2018 Math 26600, Differential Equations.

Jan - May 2018 Math 16500, Analytic Geometry and Calculus 1.

Aug - Dec 2017 Math 26600, Differential Equations.

Aug - Dec 2017 Math 22200, Calculus for Technology 2.

*Department of Mathematics, UBC*

Jan - Apr 2017 Math 101, Integral Calculus (Recitation Instructor).

Sep - Dec 2015 Math 180, Differential Calculus.

## Service

Aug - Dic 2022 Co-organization of the Algebraic Topology Seminar at CIMAT, together with J. Cantarero. Reading seminar on “The Sullivan conjecture”.

Feb 2021 - Jun 2022 Co-organization of the online seminar *IMUNAM Algebraic Topology Seminar* together with O. Antolín-Camarena and R. Jiménez Rolland, via Zoom.

Sep 7-9 2021 Co-organization of the online workshop *Spaces of homomorphisms and classifying spaces* together with O. Antolín-Camarena, S. Gritschacher and C. Okay.

## Invited Conference and Seminar Talks

### Sobre la familia de subgrupos nilpotentes de un grupo y COPOs asociados

Oct 2022 *Congreso Nacional de la SMM*, Sesión especial: *Herramientas categóricas y reticulares*, CUCEI, Guadalajara, Jal, Mexico.

### Componentes topológicas de espacios de representaciones

Oct 2022 *Enuentro de Topología*, CIMAT–UADY, Mérida, Yuc, Mexico.

Sep 2022 *Coloquio*, CIMAT–FMAT, Mérida, Yuc, Mexico.

### Una introducción a los invariantes en topología algebraica

Jul 2022 *Escuelas de Verano en CIMAT 2022*, CIMAT, Mérida, Yuc, Mexico.

### El espacio clasificante para conmutatividad de un grupo

Feb 2022 *Seminario de Topología Algebraica*, CIMAT, Mérida, Yuc, Mexico.

### Espacios de representaciones

Aug 2021 *Seminario de Álgebra* (online), *Universidad de Guadalajara*, Guad, Jal, Mexico.

Aug 2021 *Seminario Virtual de Topología Algebraica*, CIMAT, Guanajuato, Gto, Mexico.

### A Lie group analogue of the coset poset of abelian subgroups

Feb 2021 *Topology Seminar* (online), *University of Rochester*, Rochester, New York, US.

Nov 2020 *Topology Seminar* (online), *Bilkent University*, Ankara, Turkey.

### El COPO de clases laterales de familias de subgrupos de un grupo

Oct 2020 *Congreso Nacional Virtual de la Sociedad Matemática Mexicana*, invited lecture.

### The complex of affinely commutative sets

Oct 2019 *Algebra/Topology Seminar*, KU, Copenhagen, Denmark.

Mar 2019 *Modern Analysis and Geometry Seminar*, IUPUI, Indianapolis, Indiana, US.

Aug 2019 *Coloquio*, IM–UNAM, Cuernavaca, Mor, Mexico.

### Representaciones y haces vectoriales con conexiones planas

May 2019 *Coloquio*, DM–CUCEI *Universidad de Guadalajara*, Guadalajara, Jal, Mexico.

May 2019 *Jornadas de Topología*, UJED, Durango, Dgo, Mexico.

### Cociclos conmutativos y haces estables sobre superficies

Feb 2019 *Seminario Geometría y Topología*, IM–UNAM, Oaxaca, Oax, Mexico.

Nov 2018 *Prospectos en Topología*, CCM–UNAM, Morelia, Mich, Mexico.

Nov 2018 *Jor. geometría, topología y dinámica*, CCSG–CINVESTAV, Mexico City, Mexico.

Dec 2017 *Seminario G. Torres de Geometría y Topología, IM-UNAM, Mexico City, Mexico.*

#### Classifying spaces for commutativity

Mar 2019 *Topology Seminar, Johns Hopkins University, Baltimore, Maryland, US.*

Apr 2018 *Topology Seminar, University of Rochester, Rochester, New York, US.*

Mar 2018 *Topology Seminar, Purdue University, West Lafayette, Indiana, US.*

Feb 2018 *Homotopy Theory Seminar, Ohio State University, Columbus, Ohio, US.*

Feb 2018 *Modern Analysis and Geometry Seminar, IUPUI, Indianapolis, Indiana, US.*

Nov 2017 *Algebraic Topology Seminar, Indiana University, Bloomington, Indiana, US.*

Oct 2017 *Geometry and Topology Seminar, Tulane University, New Orleans, Louisiana, US.*

#### Spaces of nilpotent representations in $SU(2)$

Aug 2017 *Modern Analysis and Geometry Seminar, IUPUI, Indianapolis, Indiana, US.*

Mar 2017 *Topology Seminar, UBC, Vancouver, British Columbia, Canada.*

#### Homotopy stable decomposition of spaces of homomorphisms

May 2017 *AMS Spring Eastern Sectional Meeting, CUNY Hunter College, New York, US.*

Feb 2016 *Topology Seminar, UBC, Vancouver, British Columbia, Canada.*