

# Pedro MONTERO

*Ph.D. in Mathematics*

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26 years old, Chilean

## Education

- 2014 - 2017 **Ph.D. in Mathematics**, *Université Grenoble Alpes*, Grenoble, France.
- 2013 - 2014 **Master 2 Research in Mathematics**, *Université Joseph Fourier*, Grenoble, France.
- 2011 - 2013 **M.Sc. in Mathematics**, *Universidad Técnica Federico Santa María (UTFSM)*, Valparaíso, Chile.
- 2009 - 2011 **B.Sc. in Mathematics**, *Universidad Técnica Federico Santa María (UTFSM)*, Valparaíso, Chile.

## Appointments

- 2018 - 2020 **Postdoctoral Researcher**.  
Institute of Mathematics, AMSS, Chinese Academy of Sciences. Beijing, China
- 2017 - 2018 **Temporary Lecturer and Research Assistant (ATER)**.  
UFR IM<sup>2</sup>AG, Université Grenoble Alpes. Grenoble, France
- 2015 - 2017 **Temporary Lecturer**.  
UFR IM<sup>2</sup>AG, Université Grenoble Alpes. Grenoble, France
- 2014 - 2017 **Ph.D. Researcher**.  
Institut Fourier, Université Grenoble Alpes. Grenoble, France
- 2012 **Temporary Lecturer**.  
Department of Mathematics, UTFSM. Valparaíso, Chile
- 2009 - 2012 **Teaching Assistant**.  
Department of Mathematics, UTFSM. Valparaíso, Chile

## Theses in Mathematics

- 2017 “**Geometry of singular Fano varieties and projective bundles over curves**”, Université Grenoble Alpes, Grenoble. Ph.D. Thesis defence: October 2017.  
Supervisors: Stéphane DRUEL and Catriona MACLEAN
- 2014 “**Rationally connected varieties and their behaviour in family**”, Université Joseph Fourier, Grenoble. Master 2 Thesis defence: June 2014.  
Supervisor: Catriona MACLEAN
- 2012 - 2013 “**On the automorphism group of complete intersections of type (2,3)**”, Universidad Técnica Federico Santa María, Valparaíso. Master Thesis defence: July 2013.  
Supervisor: Victor GONZÁLEZ-AGUILERA
- 2011 “**Complex algebraic surfaces of type K3**”, Universidad Técnica Federico Santa María, Valparaíso. Undergraduate Thesis defence: July 2011.  
Supervisor: Victor GONZÁLEZ-AGUILERA

## Research

- In progress **Equivariant compactifications of  $\mathbb{G}_a^n$  by Fano manifolds with reducible boundary divisor**, Institut Fourier, Grenoble. Joint work with Zhizhong HUANG (Institut Fourier).  
Abstract: In this article, we study equivariant compactifications of the additive group  $\mathbb{G}_a^n$  which are Fano manifolds of dimension  $n$  with Picard number greater or equal than two.

- 2017 **Newton-Okounkov bodies on projective bundles over curves**, Institut Fourier, Grenoble. Electronic preprint arXiv:1703.06828 (submitted).  
 Abstract: In this article, we study Newton-Okounkov bodies on projective vector bundles over curves. Inspired by Wolfe's estimates used to compute the volume function on these varieties, we compute all Newton-Okounkov bodies with respect to linear flags which are compatible with the Harder-Narasimhan filtration of the bundle. Moreover, we characterize semi-stable vector bundles over curves via Newton-Okounkov bodies.
- 2016 **On singular Fano varieties with a divisor of Picard number one**, Institut Fourier, Grenoble. Electronic preprint arXiv:1605.08307 (to appear in *Annali della Scuola Normale Superiore di Pisa, Classe di Scienze*).  
 Abstract: In this paper we study the geometry of mildly singular Fano varieties on which there is an effective prime divisor of Picard number one. Afterwards, we address the case of toric varieties. Finally, we treat the lifting of extremal contractions to universal covering spaces in codimension 1.
- 2011 **Research Assistant at Universidad Tecnica Federico Santa Maria**.  
 "Riemann surfaces and their fields of moduli" supervised by Rubén HIDALGO.

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## Talks

- January 25th, 2018 **"Newton-Okounkov bodies and semi-stability of vector bundles over curves"**, *Geometry and Dynamical Systems Seminar, Institut de Mathématiques de Bourgogne*, Dijon, France.
- November 2nd, 2017 **"Geometry of singular Fano varieties"**, *Algebraic Geometry Seminar, Departamento de Álgebra, Universidad Complutense de Madrid*, Madrid, Spain.
- October 23rd, 2017 **"On singular Fano varieties with a divisor of Picard number one"**, *Complex Geometry Seminar, Institut Élie Cartan*, Nancy, France.
- May 22nd, 2017 **"Newton-Okounkov bodies and semi-stability of vector bundles over curves"**, *Algebra and Geometry Seminar, Institut Fourier*, Grenoble, France.
- November 16th, 2016 **"The Jordan property and the Cremona group"**, *Ph.D. Seminar, Institut Fourier*, Grenoble, France.
- September 1st, 2016 **"On singular Fano varieties with a divisor of Picard number one"**, *Iskovskikh Seminar, Steklov Mathematical Institute*, Moscow, Russia.
- April 25th, 2016 **"What is a minimal model?"**, *Ph.D. Seminar, Institut de Mathématiques de Bourgogne*, Dijon, France.
- January 6th, 2016 **"Vector bundles and Chern classes"**, *Ph.D. Seminar, Institut Fourier*, Grenoble, France.
- August 19th, 2015 **"On the Picard number of singular Fano varieties"**, *Valparaiso's Seminar on Arithmetic and Geometry*, Valparaiso, Chile.
- August 13rd, 2015 **"Minimal Model Program: The toric case and applications"**, *Colloquium of Mathematics, Instituto de Matemática y Física, Universidad de Talca*, Talca, Chile.
- April 22nd, 2015 **"Toric surfaces"**, *Ph.D. Seminar, Institut Fourier*, Grenoble, France.
- December 18th, 2014 **"Dessins d'enfants, Riemann surfaces and Number fields"**, *Ph.D. Seminar, Institut Fourier*, Grenoble, France.
- August 7th, 2014 **"Rationally connected varieties"**, *Seminar of Mathematics, UTFSM*, Valparaiso, Chile.
- July 31st, 2014 **"Rationally connected varieties and their behaviour in families"**, *Colloquium of Mathematics, Instituto de Matemática y Física, Universidad de Talca*, Talca, Chile.
- May 23rd, 2013 **"Automorphisms of Projective Algebraic Varieties"**, *Colloquium of Mathematics, IMA, PUCV*, Valparaiso, Chile.
- April 20th, 2012 **"Varieties of type (2,3) associated to cubic hypersurfaces with automorphisms"**, *XXV Jornada de Matemática de la Zona Sur*, Concepcion, Chile.
- November 25th, 2011 **"Complex algebraic surfaces of type  $K3$ "**, *IX Encuentro de Geometría Compleja y Sistemas Dinámicos*, Valparaiso, Chile.

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## Conferences and Seminars attended

- 2017 **New Advances in Fano Manifolds**, *University of Cambridge, United Kingdom*, December 4th to 8th.
- 2017 **Stability, Boundedness and Fano Varieties**, *BICMR, Beijing, China*, August 28th to September 2nd.
- 2017 **Workshop on The Classification of codimension 1 Foliations**, *Porquerolles, France*, July 3rd to 7th.
- 2017 **Conference in Complex Analytic and Differential Geometry (in honour of Jean-Pierre Demailly)**, *Grenoble, France*, June 6th to 9th.
- 2017 **Spring School: Positivity in Arithmetic and Geometry**, *Département de Mathématiques d'Orsay, France*, May 29th to June 2nd.
- 2017 **Annual Meeting of the Research Group on Algebraic Geometry and Complex Geometry**, *CIRM, Marseille, France*, January 23rd to 27th.
- 2016 - 2017 **Seminar on Algebraic Stacks**, *Co-organizer along with Louis-Clément LEFÈVRE, Institut Fourier, Grenoble, France*, since December 2016, Speaker.
- 2016 **Workshop on "Complex Affine Geometry, Effective Hyperbolicity, Analysis in honor of Mikhail Zaidenberg"**, *Grenoble, France*, October 24th to 28th.
- 2016 **Seminar on Algebraic Surfaces**, *Co-organizer along with Louis-Clément LEFÈVRE, Institut Fourier, Grenoble, France*, March to June, Speaker.
- 2015 **Seminar on Rationality of Varieties**, *Organized by Emmanuel PEYRE, Institut Fourier, Grenoble, France*, October to December, Speaker.
- 2014 - 2015 **Seminar on Deformation Theory**, *Co-organizer along with Louis-Clément LEFÈVRE, Institut Fourier, Grenoble, France*, November 2014 to April 2015, Speaker.
- 2014 **Sino-French conference on Stability in Geometry and Arithmetic (Atelier franco-chinois sur la stabilité en géométrie et arithmétique)**, *Institut Fourier, Grenoble, France*, June 2nd to 6th.
- 2013 **Master class: Around Torelli's theorem for K3 surfaces**, *Strasbourg, France*, October 25th to November 1st.
- 2012 **XXV Jornada de Matematica de la Zona Sur**, *Concepcion, Chile*, April 18th to 20th.
- 2012 **X Encuentro de Geometria Compleja y Sistemas Dinamicos**, *Valparaiso, Chile*, July 18th to 20th.
- 2012 **Seminar on Abelian Varieties**, *Organized by Victor GONZÁLEZ-AGUILERA, UTFSM, Chile*, July to December, Speaker.
- 2011 **XXIV Jornada de Matematica de la Zona Sur**, *Pucon, Chile*, April 27th to 29th.
- 2011 **IX Encuentro de Geometria Compleja y Sistemas Dinamicos**, *Valparaiso, Chile*, November 25th.
- 2011 **Seminar on Algebraic Surfaces**, *Organized by Giancarlo URZÚA, PUC, Chile*, July to December, attended.
- 2011 **Seminar on Fields of definition and Fields of moduli of algebraic varieties**, *Organized by Rubén HIDALGO, UTFSM, Chile*, March to December, Speaker.
- 2010 **V Iberoamerican Congress on Geometry**, *Pucon, Chile*, December 10th to 13rd.
- 2010 **Seminar on Riemann Surfaces and Kleinian groups**, *Organized by Rubén HIDALGO, UTFSM, Chile*, March to December, Speaker.

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## Summer schools attended

- 2016 **New Methods in Birational Geometry**, *Institut de Mathématiques de Toulouse, Toulouse, France*, June 22nd to July 1st.

- 2016 **CIMPA-ICTP Research School Toric methods in geometry, arithmetics, and dynamics**, *Santiago, Chile*, January 11th to 22nd.
- 2013 **Summer Program (Programa de Verão)**, *IMPA, Rio de Janeiro, Brazil*, January 7th to March 1st.  
3 Ph.D. courses attended: Commutative algebra, Representation theory and Complex Varieties
- 2012 **Valparaiso's Summer School in Mathematics (Escuela de Verano en Matematica de Valparaiso)**, *UTFSM, Valparaiso, Chile*, December 3rd to 14th.  
3 Ph.D. courses attended: Galois theory, Convex Analysis and Probabilities
- 2010 **School on Complex Geometry**, *Pucon, Chile*, December 7th to 9th.  
Algebraic Geometry

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## Teaching experience

- 2017-2018 **MAT101**, *A first course in mathematical analysis for students of Mathematics and Informatics*, Université Grenoble-Alpes.  
1st semester. 6 hours per week.
- 2017 **MAT206**, *Population dynamics: discrete and continuous dynamical systems for Biology*, Université Grenoble-Alpes.  
2nd semester. 3 hours per week.
- 2016 **MAT103**, *Differential and Integral Calculus, Introduction to Linear Algebra*, Université Grenoble-Alpes.  
1st semester. 3 hours per week.
- 2015-2016 **MAT11A**, *Differential and Integral Calculus, Ordinary Differential Equations*, Université Grenoble-Alpes.  
1st semester. 5 hours per week.
- 2012 **MAT023 (Calculus III)**, *Multivariable Differential Calculus, Ordinary Differential Equations, Fourier Series and Integral transforms*, Universidad Técnica Federico Santa María.  
1st and 2nd semester. 4,5 hours per week each semester.
- 2012 **MAT024 (Calculus IV)**, *Multiple integrals, Vector Calculus and Partial Differential Equations*, Universidad Técnica Federico Santa María.  
2nd semester. 4,5 hours per week.
- 2009-2012 **Teaching Assistant**, *Calculus I, II, III and IV, Real Analysis, Complex Analysis and Abstract Algebra*, Universidad Técnica Federico Santa María.  
Each semester at least 1 or 2 courses. 1,5 hours per week.
- 2009 **Workbook for the course MAT021 (Calculus I) at Universidad Técnica Federico Santa María, 81 pages**.  
Co-author with Patricio GUZMÁN and Iván SZÁNTÓ.

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## Organization of Conferences and Seminars

- 2016 - 2017 **Seminar on Algebraic Stacks**, *Co-organizer along with Louis-Clément LEFÈVRE*, Institut Fourier, Grenoble, France, December 2016 to February 2017, Speaker.  
The goal of this seminar was to learn about stacks, both in the context of algebraic geometry (moduli spaces, quotients) and of topology (orbifolds, algebraic topology).
- 2016 **Seminar on Algebraic Surfaces**, *Co-organizer along with Louis-Clément LEFÈVRE*, Institut Fourier, Grenoble, France, March to June, Speaker.  
The goal of this seminar was to learn about algebraic surfaces. We worked through the book "Complex Algebraic Surfaces" by A. Beauville.
- 2015 **Inter'Actions en Mathématiques 2015**, *Grenoble, France*, May 26th to 29th.  
Inter'Actions en Mathématiques is a conference aimed to all Ph.D. students in Pure and Applied Mathematics in France. The main purpose of the conference is the interaction between young mathematicians of different research areas. In 2015 it was organized by 9 Ph.D. students from Grenoble and Chambéry.

2014 - 2015 **Seminar on Deformation Theory**, *Co-organizer along with Louis-Clément LEFÈVRE*, Institut Fourier, Grenoble, France, November 2014 to April 2015, Speaker. The goal of this seminar was to learn about deformation theory from an algebraic point of view. We worked through the book "Deformation Theory" by R. Hartshorne.

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## Languages

Spanish	<b>Native language</b>	
French	<b>Fluent</b>	<i>In France since 2013.</i>
English	<b>Fluent</b>	<i>Studied since Primary School.</i>
Portuguese	<b>Fluent</b>	<i>Personal studies since 2013.</i>
Japanese	<b>Beginner</b>	<i>Studies at ELJ 2016-2017, Grenoble, France.</i>
Italian	<b>Beginner</b>	<i>Studies at LANSAD 2014-2015, Grenoble, France.</i>
Russian	<b>Beginner</b>	<i>Studies at LANSAD 2014-2015, Grenoble, France.</i>

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## Other interests

Responsibilities Representative of Ph.D. Students at Institut Fourier's Laboratory Council (2015-2017).

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## Academic awards

- 2018 Academy of Mathematics and Systems Science (Chinese Academy of Sciences) Postdoctoral Grant, Chinese government.
  - 2017 Temporary Lecturer and Research Assistant (ATER) Position Grant, UFR IM<sup>2</sup>AG, Université Grenoble Alpes.
  - 2017 Temporary Lecturer and Research Assistant (ATER) Position Grant, Département de Mathématiques d'Orsay, Université Paris-Sud 11 (not accepted).
  - 2014 French Ph.D. Fellowship "Allocation de recherche", French Ministry of Higher Education and Research, French government.
  - 2013 Master 2 Research Fellowship, Embassy of France in Chile, French government.
  - 2013 National Institute for Pure and Applied Mathematics (IMPA) Summer Program Fellowship, Brazilian government.
  - 2012 "Jorge Billeke 2012" Prize, awarded to the best student in mathematics graduated in 2011, Mathematical Society of Chile (SOMACHI).
  - 2012 Master Fellowship CONICYT, Chilean government.
  - 2011 Best Student of the University (around 18,000 students in total), Universidad Técnica Federico Santa María.
- 2007 and 2008 Selected for the Regional Team for the National Olympiads on Physics.