CURRICULUM VITA

Joaquín Moraga

Born: March 5th, 1994, Concepción, Chile.
Nationality: Chilean.
Address: Department of Mathematics, Fine Hall.
Washington Road, Fine Hall, 609.
Princeton, New Jersey, 08540.

Employment:

Princeton University	**September 2019 - June 2022**
Instructor in Mathematics.	

Education:

University of Utah	**August 2015- May 2019**
Ph.D. Mathematics.	
Adivsor: Christopher Hacon.	

Universidad de Concepción	**March 2014- June 2015**
M.S. Mathematics.	
Advisors: Antonio Laface and Alvaro Liendo.	

Universidad de Concepción	**March 2012- November 2013**
B.S. Mathematics.	

Research:

(1) Linear systems on the blow-up of $(\mathbb{P}^1)^n$ (with A. Laface). Linear Algebra and its Applications, Volume 492 (2016), Pages 52-67.

(2) On a notion of toric special linear systems. Journal of Pure and Applied Algebra, Volume 223, Issue 8, August 2019, Pages 3225-3237.

(3) On the topology of rational T-varieties of complexity one (with A. Laface and A. Liendo). Moscow Mathematical Journal. 20 (2020), no. 2, 405-404.

(4) Bounding singular surfaces via Chern numbers. Mathematische Zeitschrift. 295 (2020), no. 3-4, 1597-1614.

(5) The fundamental group of a log terminal T-variety (with A. Laface and A. Liendo). European Journal of Mathematics, September 2019, Volume 5, Issue 3, pp 937–957.

(6) Termination of pseudo-effective 4-fold flips. Submitted.

(7) On weak Zariski decompositions and termination of flips (with C. Hacon). To appear in Mathematical Reseach Letters.

(8) Cohen-Macaulay Du Bois singularities with a torus action of complexity one (with A. Laface and A. Liendo). Submitted.

(9) Regularity of structure sheaves of varieties with isolated singularities (with J. Park and L. Song). Communications in Contemporary Mathematics. (2020) 2050039 (25 pages).

(10) On minimal log discrepancies and Kollár components. To appear in Manuscripta Mathematica.

(11) Strong (δ, n)-complements for semistable morphisms (with S. Filipazzi). Documenta Mathematica. 25, 1953-1996 (2020).

(12) A boundedness theorem for cone singularities. To appear in Proceedings of the Edinburgh Mathematical Society.

(13) Bounded deformations of (ϵ, δ)-log canonical singularities. (with J. Han and J. Liu). Journal of Mathematical Sciences (Tokyo). Vol. 27 (2020), No. 1, Page 1-28.

(14) Log canonical 3-fold complements (with S. Filipazzi and Y. Xu). Submitted.

(15) Extracting non-canonical places. Advances in Mathematics. 375 (2020) 107415, 12pp..

(16) Fano type surfaces with large cyclic automorphisms. Submitted.

(17) The Jordan property for local fundamental groups. (with Lukas Braun, Stefano Filipazzi and Roberto Svaldi). To appear in Geometry and Topology.

(18) Special termination for log canonical pairs. (with Vladimir Lazić and Nikolaos Tsakanikas). Submitted.

(19) Kawamata log terminal singularities of full rank. ArXiv:2007.10322. Submitted.

(20) Small quotient minimal log discrepancies. To appear in Michigan Mathematical Journal.

(21) Maximal log Fano manifolds are generalized Bott towers. (with Konstantin Loginov). Submitted.

(22) Iteration of Cox rings of klt singularities. (with Lukas Braun). Submitted.

(23) On a toroidalization for klt singularities. ArXiv:2106.15019. Submitted.

(24) A geometric characterization of toric singularities. (with Roberto Svaldi). ArXiv:2108:01717. Submitted.

(25) Minimal log discrepancies of regularity one. ArXiv:2108:01717. Submitted.

(26) On termination of flips and fundamental groups. ArXiv:2109:05608. Submitted.

(27) Reductive quotients of klt singularities. (with Lukas Braun, Daniel Greb, and Kevin Langlois). Work in progress.

(28) Bounding toric singularities with normalized volume. (with Hendrik Suess). Work in progress.

(29) On the topology of log canonical singularities. (with Fernando Figueroa). Work in progress.

(30) Solvable covers of klt varieties. (with Lukas Braun). Work in progress.

Distinctions and Awards:

As high-school student:

Universidad de Concepción Mathematical Olympiad. Several prizes: 1 Honorable mention, 1 silver medal, and 3 gold medals.
Chilean Mathematical Olympiad. Several prizes: 1 Honorable mention, 1 bronce medal, 1 silver medal, and 1 gold medal.
Participation in the XX Mathematical Olympiad of the Southern Cone, Brazil 2010.

As undergraduate student:

Second place in the "Youth mathematical talent competition" held by the school of engineers of Chile 2013.
Premio Universidad de Concepción 2014 (highest distinction of the university).

As master student:

National scholarship for master students 2014.
Highest distinction from the Chilean Mathematical Society for master students 2014.

As Ph.D. student:

Rushing Graduate Scholarship Award, Summer 2018.

As a postdoctoral researcher:

Teaching Award, Princeton University, Spring 2020: In recognition of outstanding remote instruction and service.

Invited Talks:

Spring 2014: Jornada Matemática de la Zona Sur, Chile, Sesión de Geometria.
Spring 2014: LXXXIII encuentro anual de la sociedad chilena de matemática, Sesión de Geometria.
Spring 2015: Pontificia Universidad Católica de Chile, Seminario de Geometria Algebraica.
Fall 2015: Graduate Student Advisory Commitee at the University of Utah.
Summer 2016: Mathematical Coloquium at Universidad de Concepción.
Fall 2016: Algebraic Geometry Students Seminar at the University of Utah.
Spring 2017: Mathematical Coloquium at Universidad de Concepión.
Spring 2017: Algebraic Geometry Students Seminar at the University of Utah.
Fall 2017: Algebraic Geometry Students Seminar at the University of Utah.
Spring 2018: University of California, Riverside. Algebraic Geometry Seminar.
Fall 2018: Algebraic Geometry Students Seminar at the University of Utah.
Fall 2018: University of Utah, Algebraic Geometry seminar.
Fall 2018: University of California, San Diego. Algebraic Geometry Seminar.
Fall 2018: AMS sectional meeting, Birational Geometry session, Arkansas.
Fall 2018: University of Michigan, Algebraic Geometry seminar.
Spring 2019: Cambridge University, Algebraic Geometry seminar.
Summer 2019: MIPT, Laboratory of Homological Algebra, Moscow.
Fall 2019: John Hopkins University, Algebraic Geometry Seminar.
Fall 2019: Princeton University, Algebraic Geometry Seminar.
Spring 2020: UCLA, Algebraic Geometry Seminar.
Spring 2020: Columbia University, "Talk till your stuck" seminar.
Spring 2020: Rutgers University, Algebraic geometry seminar.
Spring 2020: Moscow Algebraic Geometry Zoom Seminar.
Spring 2020: Coronags Zoom seminar: "The Minimal Model Program".
Spring 2020: Yale Algebraic geometry Zom seminar.
Fall 2020: Zoom Algebraic Geometry Seminar.
Fall 2020: Michigan State University, Algebraic Geometry Seminar.
Spring 2021: Forschungsseminar - Algebra/Algebraische Geometrie.
Spring 2021: Singularities and Topology team of the Department of Mathematics of UFC.
Spring 2021: Algebraic Geometry Seminar, Kansas University.
Summer 2021: Tsinghua University, Workshop on generalized pairs.
Summer 2021: UIC, Algebraic Geometry Seminar.
Fall 2021: Princeton University, Princeton AG Seminar.
Fall 2021: Stanford University, Algebraic Geometry Seminar.
Fall 2021: Columbia University, Algebraic Geometry Seminar.
Fall 2021: UCLA, Mathematics Department Colloquium.

Fall 2021: UCLA, Algebraic Geometry Seminar.
Fall 2021: University of Madrid, Iberoamerican seminar in singularity theory.
Fall 2021: University of Jena, Germany, Algebra Seminar.
Fall 2021: John Hopkins University, Algebraic Geometry Seminar.
Fall 2021: Algebraic Geometry Northeastern Series.
Spring 2022: IPAM, Mathematical Science Conference 2022.
Spring 2022: Higher Dimensional Algebraic Geometry at Simons Foundation.

Teaching:

Universidad de Concepción:

Spring 2012: Teaching assistant, Introduction to Mathematics.
Spring 2012: Teaching assistant, Vector calculus.
Fall 2012: Teaching assistant, Vector calculus.
Spring 2013: Teaching assistant, Vector calculus.
Fall 2013: Teaching assistant, Vector calculus.
Spring 2014: Teaching assistant, Vector calculus.
Fall 2014: Teaching assistant, Vector calculus.

Mathematical Olympiad Training:

Summer 2013: Instructor, Summer school of Mathematics, Training for the chilean mathematical olympiad.
Summer 2014: Instructor, Summer school of Mathematics, Training for the chilean mathematical olympiad.

University of Utah:

Fall 2015: Teaching assistant, MATH 1311, Accelerated engineering calculus.
Spring 2016: Teaching assistant, MATH 1321, Accelerated engineering calculus.
Fall 2016: Instructor, MATH 1030, Introduction to quantitative reasoning.
Fall 2017: Instructor, MATH 1220, Calculus 2.
Fall 2018: Instructor, MATH 1210, Calculus 1.

Princeton University:

Fall 2019: Instructor, MAT201, Section C0A1, Multivariable Calculus.
Spring 2020: Instructor, MAT202, Section C0A1 and C0B2, Linear Algebra.
Fall 2020: Instructor, MAT201, Section C04A.
Spring 2021: Instructor, MAT202, Section C04A
Fall 2021: Instructor, MAT 201, Section C04A and C03C.

Profesional Activities:

Students supervised:

Daigo Ito, junior student at Princeton University, Summer Research Project 2020 on Deformation Theory.
Paper title: Algebraic Geometry of Flag Varieties.
Daigo Ito, second reader for senior thesis and thesis defense.
Thesis title: The Minimal Model Program and Resolution of cDV Singularities.
Fernando Figueroa, Ph.D. student at Princeton University, co-advisor.
Papers: On the topology of lc singularities (In Preparation).

Seminars organized:

Spring 2020: CORONA Geometry Seminar (with S. Makarova and E. Elmanto).
Spring 2020: Princeton Algebraic Geometry preprint seminar.
Summer 2020: Princeton Algebraic Geometry preprint seminar.
Fall 2020: Princeton Algebraic Geometry Seminar (with C. Xu).
Fall 2020: Princeton Algebraic Geometry preprint seminar (with D. Villalobos Paz).
Spring 2021: Princeton Algebraic Geometry Seminar (with C. Xu).
Spring 2021: Princeton Algebraic Geometry preprint seminar (with D. Villalobos Paz).
Spring 2021: Minimal Model Program Learning Seminar.
Topics: Kollár-Mori "Birational geometry of algebraic varieties" and Multiplier Ideals.[1]
Summer 2021: Princeton Algebraic Geometry Seminar (with C.Xu).
Summer 2021: Princeton Algebraic Geometry preprint seminar (with F. Figueroa).
Summer 2021: Minimal Model Program Learning Seminar.
Topics: The work of Hacon and McKernan.
Fall 2021: Princeton Algebraic Geometry Seminar (with C. Xu).
Fall 2021: Princeton Algebraic Geometry preprint Seminar (with F. Figueroa).
Fall 2021: Minimal Model Program Learning Seminar.
Topics: Existence of minimal models for varieties of general type.

Refereed for journals:

European Journal of Mathematics, International Mathematics Research Notices, Journal of Algebra and
Number Theory, Compositio Mathematica, International Journal of Mathematics, American Journal of
Mathematics, Mathematische Annalen, Mathematische Zeitschrift, Proceeding of the London Mathematical
Society, Bulletin of the London Mathematical Society, and Springer Proceedings of Moscow-Shanghai-Pohang
conference. Gave opinions on papers for Inventiones Mathematichae.

Reviewed for journals:

Zentralblatt MATH and Mathematical Reviews (AMS).

Outreach:

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[1]This seminar aims to train young graduate students on the techniques of the Minimal Model Program. It runs over zoom
and has attendees from many universities around the world.

Founder and instructor at the Community Park Elementary School "Math Club"[2].
Spring 2021: Hanoi towers and inductive puzzles.
Summer 2021: Bridges and graphs.
Fall 2021: Numbers and geometry: Fibonacci sequence and golden ratio.

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[2]The aim of this Math Club is to show the beauty of mathematics to 4th and 5th year elementary school students.