

Marco Castronovo – CV

Personal Italian citizenship, USA green card
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Employment

2021- **Ritt Assistant Professor - Columbia University, USA**
Parental leaves: Spring 2022, Spring 2024

Education

2016-2021 **PhD in Mathematics - Rutgers University, USA**
Thesis advisor: Chris Woodward

2012-2015 **Laurea Magistrale in Matematica - Università di Pisa, Italy**
Final grade: 110/110 cum laude

2009-2012 **Laurea Triennale in Matematica - Università di Pisa, Italy**
Final grade: 110/110

Visits

August 2015 - May 2016
Indiana University, Bloomington (IN), USA
Main scientific advisor: **Dylan Thurston**
Funding: Indiana University Graduate Fellowship

September 2014 - June 2015
Max Planck Institute for Mathematics, Bonn, Germany
Main scientific advisor: **Peter Teichner**
Funding: International Max Planck Research School for Moduli Spaces Fellowship

Awards and grants

- **2022** AMS-Simons Travel Grant
- **2021** Rutgers Outstanding Doctoral Student Award
- **2019** Rutgers TA Teaching Excellence Award

Publications and preprints

- **Cluster deep loci and mirror symmetry**
<https://arxiv.org/abs/2402.16970>
with M. Gorsky, J. Simental, D. Speyer
Submitted.
- **Curved Fukaya algebras and the Dubrovin spectrum**
<https://arxiv.org/abs/2401.13603>
Submitted.

- **Lagrangian cobordism of positroid links**
<https://arxiv.org/abs/2305.16232>
 with J. Asplund, Y. Bae, O. Capovilla-Searle, C. Levenson, A. Wu
 Submitted.
- **Liouville domains from Okounkov bodies**
<http://arxiv.org/abs/2201.01864>
 Accepted in *Journal of Topology and Analysis*
- **Exotic Lagrangian tori in Grassmannians**
<https://ems.press/journals/qt/articles/9397541>
Quantum Topology 14 (2023), no. 1, 65-99.
- **Fukaya category of Grassmannians: rectangles**
<https://doi.org/10.1016/j.aim.2020.107287>
Advances in Mathematics 372 (2020), 107287, 40 pp.

Code

- **DubrovinDynamics**
<https://gitlab.com/castronovo/dubrovindynamics>
- **Posetroids**
<https://gitlab.com/castronovo/posetroids>
- **ClusterExplorer**
<https://gitlab.com/castronovo/clusterexplorer>

Talks

Conferences:

- **Algebraic Geometry Northeastern Series**
 Rutgers University. 05/2022
- **Recent developments in Lagrangian Floer theory**
 Simons Center for Geometry and Physics. 03/2022

Seminars:

- **Rutgers University**
 Algebra Seminar. 10/2024
- **Fordham University**
 Mathematics Department Seminar. 09/2024
- **Università di Torino**
 Differential Geometry Seminar. 07/2024
- **Università di Milano**
 Algebraic Geometry Seminar. 07/2024
- **Northwestern University**
 Geometry & Physics Seminar. 05/2024
- **City University of New York**
 Topology, Geometry, and Physics Seminar. 03/2024
- **University of North Carolina - Chapel Hill**
 Physically inspired mathematics Seminar. 02/2024
- **City University of New York**
 Differential Geometry, Topology, and special structures Seminar. 02/2024
- **Stony Brook University**
 Symplectic geometry seminar. 01/2024
- **Rutgers University**
 Symplectic seminar. 10/2023
- **Columbia University**
 Informal mathematical physics seminar. 10/2023

- **Princeton University / IAS**
Symplectic Seminar. 10/2022
- **Columbia University**
Algebraic Geometry Seminar. 04/2022
- **Symplectic Zoominar (CRM-Montréal, Princeton/IAS, Tel Aviv, Paris)**
03/2022
- **IBS Center for Geometry and Physics**
Symplectic Monday Seminar. 03/2022
- **Texas A&M University**
Topology Seminar. 02/2022
- **Columbia University**
Enumerative Geometry Seminar. 10/2021
- **Western Hemisphere Virtual Symplectic Seminar**
06/2021
- **Hebrew University of Jerusalem**
Topology and Geometry Seminar. 06/2021
- **University of Southern California**
Geometry, Topology, and Categorification Seminar. 04/2021
- **Institut de Mathématiques de Jussieu**
Séminaire de Géométrie Enumérative. 01/2021
- **Universität Bonn**
Oberseminar Darstellungstheorie. 01/2021
- **Stony Brook University**
Symplectic geometry seminar. 02/2020
- **University of Cambridge**
Differential geometry & topology seminar. 01/2020
- **University of Birmingham**
Geometry and mathematical physics seminar. 01/2020
- **Columbia University**
Informal mathematical physics seminar. 10/2019
- **University of Pennsylvania**
Math-Physics joint seminar. 09/2019
- **Columbia University**
Symplectic geometry, gauge theory and categorification seminar. 02/2019

Teaching

- *Instructor at Columbia: (~25 lectures of 75 minutes per section + 2 weekly office hours)*
 - Spring 2025: **Multi-variable calculus**, 1 section
 - Fall 2024: **Single-variable calculus**, 2 sections
 - Fall 2023: **Linear algebra**, 1 section of ~80 students
 - Spring 2023: **Single-variable calculus**, 1 section of ~40 students
 - Fall 2022: **Linear algebra**, 2 sections of ~60 students
 - Fall 2021: **Linear algebra**, 2 sections of ~50 students
- *Teaching Assistant at Rutgers: (~10 workshops of 80 minutes per section + 1 weekly office hour)*
 - Spring 2021: **Real analysis**, 2 sections of ~20 students
 - Fall 2020: **Real analysis**, 1 section of ~20 students
 - Spring 2020: **Real analysis**, 1 section of ~20 students
 - Fall 2019: **Real analysis**, 2 sections of ~20 students
 - Spring 2019: **Multi-variable calculus**, 3 sections of ~25 students
 - Fall 2018: **Real analysis**, 2 sections of ~20 students
 - Spring 2018: **Single-variable calculus**, 3 sections of ~25 students
- *Grader at Rutgers: (~10 problem sheets per course)*
 - Summer 2017: **Number theory**
 - Spring 2017: **Introduction to proofs, Abstract algebra**
 - Fall 2016: **Linear algebra, Combinatorics**

Broader impact

- *Targeting undergraduates at Columbia:*
 - Summer 2024: **Columbia College Scholars Program.**
<https://urf.columbia.edu/urf/research/programs>
Student Shilpa Kesavan, 8 meetings of ~1-2 hours each. We read about some topics in algebraic topology, with a focus on generalized cohomology theories.
 - Summer 2022: **Columbia College Scholars Program.**
<https://urf.columbia.edu/urf/research/programs>
Students Erica Yousol Choi, Karina Dovgodko, Xincheng Zhang, 10 meetings of ~1-2 hours each. We learned about recent developments on the geometry of positroid strata of Grassmannians, then extended the Python code of a random walk I created to explore the cluster structure of these spaces.
- *Targeting undergraduates at Rutgers:*
 - Summer 2020: **DIMACS Research Experience for Undergraduates.**
<https://reu.dimacs.rutgers.edu/>
Students Anna Antal and Samuel Panitch, 16 meetings of ~60 minutes, mentoring done jointly with Prof. Woodward. We related different notions of "mutation" existing in recent literature: for two-variable Laurent polynomials, convex polygons, and quivers. Anna and Samuel later continued with a PhD in mathematics at Yale.
 - Spring 2017: **Math Department Directed Reading Program.**
<https://www.math.rutgers.edu/academics/undergraduate/directed-reading-program>
Student Daniel Solano, 6 meetings of ~60 minutes, coaching for final 15 minutes presentation. We read parts of Arnold-Khesin "Topological methods in hydrodynamics". Daniel later continued with a PhD in applied mathematics at Brown.
- *Targeting students in New York City high schools:*
 - Summer 2024, advised student Christopher Lee from Hunter College High School. We read parts of Lickorish "An introduction to knot theory".
- *Targeting students in New York City middle schools:*
 - Fall 2023, contributed an activity to the **Sonia Kovalevsky Day**
<https://www.math.columbia.edu/diversity/skday/>
 - Fall 2022, contributed an activity to the **Girls Science Day**
<https://www.girlsscience.com/>
- *Targeting students in Harlem primary schools:*
 - Spring 2024, volunteered for the after school program **Reading Team Math**
<https://sites.google.com/view/readingteammath>

Service

- *Referee for:*
 - Advances in Mathematics
 - Compositio Mathematica (x2)
 - International Mathematics Research Notices
 - Proceedings of the Edinburgh Mathematical Society
 - Selecta Mathematica
- *At Columbia University:*
 - 2022-23, member of a committee that overhauled the PhD program in mathematics

- 2021-24, co-organizer of the research seminar on Symplectic Geometry and Gauge Theory
 - Fall 2021, organizer of one reading group for graduate students and postdocs
- *At Rutgers University:*
 - Spring 2019, organizer of the Symplectic Literature reading group
 - Spring 2018, organizer of the Junior Geometry seminar