

MARCO RAMPAZZO

PERSONAL INFORMATION

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ACADEMIC ACTIVITY

Current position

Postdoctoral researcher, Tsinghua University – Imperial College London

Previous positions

Postdoctoral researcher, University of Antwerp	February 2025 – September 2025
Postdoctoral researcher, University of Bologna	February 2021 – January 2025
Teaching assistant, University of Bologna	October 2021 – January 2022
Teaching assistant, University of Stavanger	October 2020 – December 2020
PhD student in mathematics, University of Stavanger	September 2016 – September 2020

Long term visits

Guest of the Jagiellonian University and IMPAN, Krakow	November 2025 – December 2025
Funding: Jagiellonian University and IMPAN	

Guest of the Paul Sabatier University, Toulouse	February 2019 – May 2019
Funding: Norwegian Research Council mobility grant	

Short term visits

Guest of IMPAN, Krakow	February 2 – February 6 2026
Funding: IMPAN	

Guest of the Sun Yat-Sen University, Guangzhou	November 3 – November 7 2025
Funding: Sun Yat-Sen University	

Guest of Imperial College London, London	May 19 – May 23 2025
Funding: Imperial College London	

Guest of the Institute of Basic Science, Pohang	April 7 – April 11 2025
Funding: Institute of Basic Science	

Guest of the University of Antwerp, Antwerp	November 21 – November 23 2024
Funding: University of Antwerp	

Guest of the Jagiellonian University, Kraków	May 06 – May 17 2024
Funding: INdAM – GNSAGA, Jagielloinan University	

Guest of the Chinese University of Hong Kong, Hong Kong
Funding: The Chinese University of Hong Kong

March 08 – March 13 2024

Guest of the Jagiellonian University, Kraków
Funding: Jagiellonian University

February 05, 2024 – February 09, 2024

Guest of the Univeristy of Augsburg, Augsburg
Funding: University of Augsburg

December 28, 2023 – December 01, 2023

Guest of the Max Planck institute for Mathematics in the Sciences, Leipzig
Funding: MPS MiS

June 22, 2022 – June 24, 2022

OTHER COLLABORATIONS

Humanos s.r.l.

<https://humanos.it>

Dec 2024 – Sep 2025

Topics: retrieval-augmented generation on graph databases, LLM-based recommendation systems, multi-agent LLM-based virtual assistants.

Hello Human s.r.l.

<https://www.hellohuman.it>

July 2023 – Dec 2024

Topics: natural language processing, LLM-based approach to recommendation systems, feature extraction, sentiment analysis.

Algoretico s.r.l.s.

<https://www.algoretico.it>

January 2022 – June 2023

Topics: recommendation systems, reinforced learning, rectification problems in multiview geometry.

EDUCATION

PhD in Mathematics

University of Stavanger

Supervisor: Michał Kapustka

Thesis: “Equivalences between Calabi–Yau manifolds and roofs of projective bundles”

May 2021

Master’s degree in Physics

University of Milan

Bachelor’s degree in Physics

University of Milan

July 2016

December 2013

RESEARCH INTERESTS

My research interests are centered on complex algebraic geometry, with a particular focus on the following areas.

- **Derived categories and semiorthogonal decompositions:** Exceptional collections, semiorthogonal decompositions and mutations provide powerful tools to understand derived categories of coherent sheaves and categorical resolutions of singularities, and to investigate the geometric information that they carry.
- **Birational equivalences, K-equivalence, and the DK conjecture:** While the derived category is known to be an invariant up to isomorphism for smooth Fano and general type varieties, its behavior as a birational invariant in broader settings remains the subject of open conjectures. In particular, there is substantial

evidence suggesting that certain birational transformations, known as K -equivalences, should induce equivalences at the level of derived categories.

- **Gauged linear sigma models, phase transitions, mathematical physics:** In physics, gauged linear sigma models are supersymmetric gauge theories that exhibit multiple phases. Unlike the original abelian models, non-abelian GLSMs can have several geometric phases, each corresponding to the geometry of a smooth projective variety. Conjecturally, the physical relationship between these phases is reflected mathematically by Fourier–Mukai functors inducing equivalences, or embeddings, between the derived categories of the associated varieties.
- **Varieties with two projective bundle structures:** The classification of simple K -equivalences, i.e. K -equivalences which are resolved by single smooth blowups, is closely related to the classification of special Fano varieties called *roofs*. These are varieties of Picard rank two, whose extremal contractions are projective bundles, and such that there is a line bundle which restricts to $\mathcal{O}(1)$ on the fibers of both contractions. Despite being a roof is a rather restrictive condition, the latter classification is still an open problem.

INVITED SPEAKER

Seminar of Algebra of the Jagiellonian University. <i>Semiorthogonal decompositions for Fano varieties</i>	Kraków, December 11 2025
IMPAN Seminar of Algebraic Geometry. <i>On the derived category of nodal Gushel–Mukai fourfolds</i>	Kraków, December 9 2025
Seminar of Algebraic Geometry of the Jagiellonian University. <i>Double-mirror Calabi–Yau threefolds in Grassmannians</i>	Kraków, December 1 2025
IMPANGA seminar. <i>Window categories and birational maps</i>	Warsaw, November 14 2025
Algebraic geometry seminar. <i>Flips, flops and window categories</i>	Guangzhou, November 6 2025
Workshop “Semiorthogonal decompositions for representations of algebraic groups”. <i>Full exceptional collections on G/B</i>	Bielefeld, September 3 2025
MAGIC Seminar. <i>Derived categories and nodal Gushel–Mukai fourfolds</i>	London, May 19 2025
Algebraic Geometry Seminar. <i>Gushel–Mukai fourfolds and flops</i>	Pohang, April 08 2025
Number Theory and Algebraic Geometry Seminar. <i>Derived categories and flops</i>	Leuven, April 02 2025
Analysis & Geometry Seminar. <i>Exceptional collections for algebraic varieties</i>	Antwerp, February 26 2025
Algebra, Geometry and Number Theory Seminar. <i>Derived categories and birational transformations</i>	Antwerp, November 22 2024
IMPAN colloquium. <i>An introduction to derived categories of homogeneous varieties</i>	Kraków, May 16 2024
IMPANGA seminar. <i>Derived categories of generalized Grassmannians</i>	Warsaw, May 11 2024

MIST workshop on Derived Categories <i>Generalized Grassmann flips vs pushforwards of hyperplane sections</i>	Hong Kong, March 9 2024
Seminar of Algebraic Geometry of the Jagiellonian University. <i>DK conjecture for generalized grassmann flips</i>	Kraków, February 9 2024
Seminar of Algebra and Number Theory of the University of Augsburg. <i>Full exceptional collections for homogeneous varieties</i>	Augsburg, November 30 2023
Conference “Modern Perspectives on Birational Geometry”. <i>Simple K-equivalence and semiorthogonal decompositions</i>	Taipei, July 29 – August 4 2023
Workshop “Derived categories and birational geometry”. <i>K-equivalence and derived categories</i>	Milan, June 30 – July 1 2022
SAXAG seminar. <i>Derived categories and GLSM phase transitions</i>	Leipzig, June 23 2022
IMPANGA seminar. <i>Homogeneous roofs of projective bundles and semiorthogonal decompositions</i>	Warsaw, June 3 2022
Workshop “Grothendieck ring and derived category: a gathering”. <i>\mathbb{L}-equivalence for Calabi-Yau pairs in generalized Grassmannians</i>	Turin, April 27–28 2022
Seminar of Algebra and Geometry of the University of Bologna. <i>Semiorthogonal decompositons and homogeneous varieties</i>	Bologna, June 15 2021
Seminar of Algebra of the Jagellonian University. <i>Computing Hodge numbers of Calabi–Yau varieties in Grassmannians</i>	Kraków, April 11 2019
Workshop “Motives of Calabi–Yau manifolds”. <i>A gauged linear sigma model description for a pair of non birational Calabi–Yau threefolds</i>	Kraków, May 19–21 2018

CONTRIBUTED TALKS

Conference “Recent advances in classical algebraic geometry. <i>Hodge structures and derived categories of Fano varieties in Grassmannians.</i>	Kraków, June 27 – July 2 2022
Workshop “Algebraic Geometry days”. <i>Mukai roofs and K3 surfaces</i>	Stavanger, November 25–26 2019
Conference “Nasjonalt Algebramøte 2019”. <i>Derived equivalence of Mukai roofs: the case of K3 surfaces of degree 12</i>	Oslo, November 7–8 2019
Conference “Nasjonalt Matematikermøte 2018, PhD day”. <i>A GLSM description for a pair of non birational Calabi–Yau threefolds</i>	Bergen, September 12 2018

SEMINARS AND COURSES

PhD course: <i>Derived categories of rational homogeneous varieties</i> 18 hours. Organizer and speaker	Bologna, March – April 2024
Seminar: <i>Bridgeland stability conditions</i> Organizer together with Simone Billi, Francesco Denisi, Franco Giovenzana, Annalisa Grossi, Mihai–Cosmin Pavel. Homepage: https://marcorampazzo.com/templates/bridgeland	Bologna – Chemnitz – Nancy, fall 2021

TEACHING

Courses:

Linear algebra fall 2019

Exercise classes / tutoring:

Linear Algebra fall 2021

Discrete Mathematics, Linear Algebra fall 2020

Probability and Statistics spring 2020

Linear algebra fall 2018

Linear algebra fall 2017

PUBLICATIONS AND PREPRINTS

1. *PhD Thesis*: Marco Rampazzo. *Equivalences between Calabi–Yau manifolds and roofs of projective bundles*. (2021). <https://doi.org/10.31265/usps.78>
Available online at <https://ebooks.uis.no/index.php/USPS/catalog/book/78>
2. *Publication*: Marco Rampazzo. *Fano fibrations and DK conjecture for relative Grassmann flips*. (2024). *Publ. RIMS Kyoto Univ.* 61 (2025), 827–861. <https://doi.org/10.4171/PRIMS/61-4-7>
3. *Publication*: Riccardo Moschetti and Marco Rampazzo. *Fullness of the Kuznetsov–Polishchuk exceptional collection for the spinor tenfold*. (2024). *Algebras and Representation Theory*. <https://doi.org/10.1007/s10468-023-10246-6>
4. *Publication*: Marco Rampazzo. *New counterexamples to the birational Torelli theorem for Calabi–Yau manifolds*. (2024). *Proc. Amer. Math. Soc.* 152 (2024), 2317–2331. <https://doi.org/10.1090/proc/16745>
5. *Publication*: Enrico Fatighenti, Michał Kapustka, Giovanni Mongardi, Marco Rampazzo. *The generalized roof $F(1, 2, n)$: Hodge structures and derived categories*. *Algebras and Representation Theory* 26, 2313–2342 (2023). <https://doi.org/10.1007/s10468-022-10173-y>
6. *Publication*: Michał Kapustka, Marco Rampazzo. *Mukai duality via roofs of projective bundles*. *Bull. Lond. Math. Soc.* (2022). <https://doi.org/10.1112/blms.12597>
7. *Publication*: Michał Kapustka, Marco Rampazzo. *Torelli problem for Calabi–Yau threefolds with GLSM description*. *Communications in Number Theory and Physics*, Volume 13, No. 4 (2019). <https://dx.doi.org/10.4310/CNTP.2019.v13.n4.a2>
8. *Preprint*: Kacper Grzelakowski, Marco Rampazzo, Shizhuo Zhang. *Categorical resolutions and birational geometry of nodal Gushel–Mukai varieties*. (2026).
Available at <https://arxiv.org/abs/2602.14109>
9. *Preprint*: Will Donovan, Wahei Hara, Michał Kapustka, Marco Rampazzo. *Window categories for a simple 9-fold flop of Grassmannian type*. (2025).
Available at <https://arxiv.org/abs/2510.06184>
10. *Preprint*: Marco Rampazzo, Ying Xie. *Derived equivalence for the simple flop of type D_5* . (2024).
Available at <https://arxiv.org/abs/2410.20446>
11. *Preprint*: Marco Rampazzo. *Calabi–Yau fibrations, simple K -equivalence and mutations*. (2020).
Available at <https://arxiv.org/abs/2006.06330>