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Francesco Sala

Curriculum Vitae

Current Positions

Dec. 12,2026 – July 4, 2027 (expected) **Visiting Professor**, *Academia Sinica*, Taipei, Taiwan.

Nov. 8, 2026 – Dec. 12,2026 (expected) **Visiting Scholar**, *Hong Kong University of Science and Technology*, China.

Dec. 31, 2022 – Present **Associate Professor**, *Università di Pisa*, Italy.

Jan. 1, 2023 – Present **Visiting Scientist**, *Kavli IPMU, University of Tokyo*, Japan.

Previous Positions

2020–2022 **Visiting Associate Scientist**, *Kavli IPMU, University of Tokyo*, Japan.

2019–2022 **Assistant Professor (RTDb)**, *Università di Pisa*, Italy.

2016–2019 **Postdoctoral Fellow**, *Kavli IPMU, University of Tokyo*, Japan.

2014–2016 **Postdoctoral Fellow**, *University of Western Ontario*, London, Canada.

2012–2014 **Postdoctoral Research Associate**, *Heriot-Watt University*, Edinburgh, UK.

Education

2011 **PhD in Geometry and Doctorat en Mathématiques Pures (co-tutorial thesis)**, *SISSA*, Trieste, Italy and Université Lille 1, France.
Advisors: U. Bruzzo and D. Markushevich

2008 **Master's Degree in Mathematics (in collaboration with SISSA)**, *Università degli Studi di Trieste*, Italy, 110/110 cum laude.

2008 **Diploma "Percorso Formativo Comune"**, *SISSA*, Trieste, Italy.

2006 **Bachelor's Degree in Mathematics**, *Università degli Studi di Palermo*, Italy, 110/110 cum laude.

Academic Qualification

2023 – 2035 **"Abilitazione Scientifica Nazionale"**.
Qualified for the "Abilitazione Scientifica Nazionale a Professore di Prima Fascia - Settore concorsuale 01/A2 Geometria e Algebra" to work as a Full Professor in Geometry and Algebra at an Italian University

Research Interests

Algebraic Geometry (theory of moduli spaces, algebraic stacks, derived algebraic geometry), **Representation Theory** (quantum groups and Lie algebras), and **Mathematical Physics** (supersymmetric gauge theories, moduli spaces of instantons).

Grants and Fellowships

2026–2031 **Grant-in-Aid for Scientific Research C (PI, no. 26K06721) "Two-dimensional cohomological Hall algebras of curves and surfaces"**, *Japanese Society for the Promotion of Science (JSPS)*, Japan, ¥ 4,550,000.

2021–2026 **Grant-in-Aid for Scientific Research C (PI, no. 21K03197) "Yangians and Cohomological Hall algebras of curves"**, *Japanese Society for the Promotion of Science (JSPS)*, Japan, ¥ 4,290,000.

2023–2024 **MIT - Italy Università di Pisa Seed Fund (PI) "Quantum Structures and Enumerative Geometry"**, with A. Maffei (Università di Pisa), D. Maulik (MIT), and A. Neguţ (MIT), € 20,000.

2020–2022 **Progetto di Ricerca di Ateneo (no. PRA_2020_40) "Spazi di moduli, geometria aritmetica e aspetti storici"**, with A. Bandini, A. Cogliati, V. Melani, T. Szamuely, M. Talpo, *Università di Pisa*, Italy, € 31,625.

2018–2020 **Grant-in-Aid for Young Scientists (PI, no. JP18K13402) "Cohomological Hall algebra of a curve"**, *Japanese Society for the Promotion of Science (JSPS)*, Japan, ¥ 2,860,000.

2017–2019 **Grant-in-Aid for Research Activity Start-up (PI, no. JP17H06598) "Hall algebras and gauge theory on a surface"**, *Japanese Society for the Promotion of Science (JSPS)*, Japan, ¥ 1,300,000.

2015–2024 **Conference Grants**, *Foundation Compositio Mathematica*.
List of supported conferences and workshops:

- Quantization in Representation Theory, Derived Algebraic Geometry, and Gauge Theory. 2024
- New Perspectives on Hyperkähler Manifolds. A Celebration of Dimitri Markushevich's (60+2)nd Birthday. 2022
- IHÉS Summer School on Enumerative Geometry, Physics and Representation Theory. 2021
- CIME School on Geometric Representation Theory and Gauge Theory. 2018
- Workshop on Hall algebras, enumerative invariants and gauge theories. 2016
- Workshop on Moduli spaces in Algebraic Geometry and Mathematical Physics. 2015

2014–2024 **Conference Grants**.
Funded by: SwissMap Research Station, Switzerland (2024), CIRM Trento, Italy (2022); IHÉS, France (2021); Fields Institute, Toronto, Canada (2016); Chern Institute of Mathematics, Tianjin, China (2015); Lorentz Center, Leiden, the Netherlands (2014).

2019 **Program Participant Support**, *Simons Center for Geometry and Physics*, Stony Brook, USA.

2016 **IHP Trimester Participant Support**, *Institut Henri Poincaré*, Paris, France.

2014 **IHP Research in Pairs Fellowship**, *Institut Henri Poincaré*, Paris, France.
(with M. Pedrini)

2012–2014 **Postdoctoral Research Associate Fellowship**, *The Leverhulme Trust*, UK.

2008–2011 **PhD Student Fellowship**, *SISSA*, Trieste, Italy.

2006–2008 **Master's degree Student Fellowship "Percorso Formativo Comune"**, *SISSA*, Trieste, Italy.

Publications

Refereed Articles in Journals

[23] **Flops and Hilbert schemes of space curve singularities**, with D.-E. Diaconescu, M. Porta, and A. Vosoughinia, *Journal of Algebraic Geometry*, 2026, 35, 1–112.
[Journal link], [arXiv link]

[22] **Shuffle algebras for quivers as quantum groups**, with A. Neguţ and O. Schiffmann, *Mathematische Annalen*, 2025, 391, no. 2, 2981–3021.
[Journal link], [arXiv link]

[21] **McKay correspondence, cohomological Hall algebras and categorification**, with D.-E. Diaconescu and M. Porta, *Representation Theory of The American Mathematical Society*, 2023, 27, 933–972.
[Journal link], [arXiv link]

[20] **Two-dimensional categorified Hall algebras**, with M. Porta, *Journal of the European Mathematical Society*, 2023, 25, no. 3, 1113–1205.
[Journal link], [arXiv link]

[19] **Continuum Kac–Moody Lie algebras**, with A. Appel and O. Schiffmann, *Moscow Mathematical Journal*, 2022, 22, no. 2, 177–224.
[Journal link], [arXiv link]

[18] **Fock space representation of the circle quantum group**, with O. Schiffmann, *International Mathematics Research Notices IMRN*, 2021, no. 22, 17025–17070.
[Journal link], [arXiv link]

[17] **Quantization of continuum Kac–Moody Lie algebra**, with A. Appel, *Pure and Applied Mathematics Quarterly*, 2020, 16, no. 3, 439–493.
[Journal link], [arXiv link]

[16] **Cohomological Hall algebra of Higgs sheaves on a curve**, with O. Schiffmann, *Algebraic Geometry*, 2020, 7, no. 3, 346–376.
[Journal link], [arXiv link]

[15] **The circle quantum group and the infinite root stack of a curve**, with O. Schiffmann and with an appendix by T. Kuwagaki, *Selecta Mathematica, New Series*, 2019, no. 5, Art. 77, 86 pp.
[Journal link], [arXiv link]

[14] **Instantons and framed sheaves on Kähler Deligne-Mumford stacks**, with P. Eyssidieux, *Annales de la Faculté des Sciences de Toulouse. Mathématiques. Série 6*, 2018, 27, no. 3, 599–628.
[Journal link], [arXiv link]

[13] **AGT relations for abelian quiver gauge theories on ALE spaces**, with M. Pedrini and R. J. Szabo, *Journal of Geometry and Physics*, 2016, 103, 43–89.
[Journal link], [arXiv link]

[12] **Framed sheaves on root stacks and supersymmetric gauge theories on ALE spaces**, with U. Bruzzo, M. Pedrini, and R. J. Szabo, *Advances in Mathematics*, 2016, 288, 1175–1308.
[Journal link], [arXiv link]

[11] **$\mathcal{N} = 2$ quiver gauge theories on A-type ALE spaces**, with U. Bruzzo and R. J. Szabo, *Letters in Mathematical Physics*, 2015, 105, no. 3, 401–445.
[Journal link], [arXiv link]

[10] **Framed sheaves on projective stacks**, with U. Bruzzo and with an appendix by M. Pedrini, *Advances in Mathematics*, 2015, 272, 20–95.
[Journal link], [arXiv link]

[9] **Restriction theorems for μ-(semi)stable framed sheaves**, *Journal of Pure and Applied Algebra*, 2013, 217, no. 12, 2320–2344.
[Journal link], [arXiv link]

[8] **Symplectic structures on moduli spaces of framed sheaves on surfaces**, *Central European Journal of Mathematics*, 2012, 10, no. 4, 1455–1471.
[Journal link], [arXiv link]

Proceedings

[7] **Representations of cohomological Hall algebras via stable pairs**, with D.-E. Diaconescu and M. Porta. In "Interactions between Algebraic Geometry and Noncommutative Algebra", *Oberwolfach Reports*, 2022, 19, no. 2, 1239–1312.
[Journal link]

PhD Thesis

[6] **Some topics in the geometry of framed sheaves and their moduli spaces**, *SISSA, Trieste, and Université Lille 1, 2011*, 1–103.
[PhD Thesis link]

Submitted Papers

[5] **Cohomological Hall algebras of one-dimensional sheaves on surfaces and Yangians**, with D.-E. Diaconescu, M. Porta, O. Schiffmann, and E. Vasserot, 2026.
[arXiv link] (This paper corresponds to a revised version of Parts II, III, and IV of [iii] below).

[4] **Kleinian orbifolds, Cohomological Hall Algebras, and Yangians**, with O. Schiffmann and P. Shimpi, 2025.
[arXiv link]

[3] **Cohomological Hall algebras of one-dimensional sheaves on surfaces: Amalgamation and PBW-type theorems**, with D.-E. Diaconescu, M. Porta, O. Schiffmann, and E. Vasserot, 2025.
[link] (This paper corresponds to a revised version of Part V of [iii] below.)

[2] **Nilpotent cohomological Hall algebras of surfaces**, with D.-E. Diaconescu, M. Porta, O. Schiffmann, and E. Vasserot, 2025.
[arXiv link] (This paper corresponds to a revised version of Part I of [iii] below.)

[1] **Cohomological Hall algebras, their categorification, and their representations via torsion pairs**, with D.-E. Diaconescu and M. Porta, 2022.
[arXiv link]

Preprints

[iii] **Cohomological Hall algebras of one-dimensional sheaves on surfaces and Yangians: a comprehensive account**, with D.-E. Diaconescu, M. Porta, O. Schiffmann, and E. Vasserot, *(this work is superseded by [2], [3], and [5] above)*, 2025.
[arXiv link]

[ii] **Simpson's shapes of schemes and stacks**, with M. Porta, 2020.
[link]

[i] **Representations of the Heisenberg algebra and moduli spaces of framed sheaves**, with P. Tortella, 2010.
[arXiv link]

Editorial Work

2019 Editor (with U. Bruzzo and A. Grassi). "Geometric Representation Theory and Gauge Theory". Cetraro, Italy 2018. Lecture Notes in Mathematics. Fondazione CIME/CIME Foundation Subseries. Springer, 2019

2017 Special Issue Managing Editor. "Interactions between Geometry and Physics. A topical issue in honor of Ugo Bruzzo's 60th birthday", Journal of Geometry and Physics, 2017, 118, 1–234

2016 Guest Editor (with U. Bruzzo). Special issue on "Instanton Counting: Moduli Spaces, Representation Theory and Integrable Systems", Journal of Geometry and Physics, 2016, 109, 1–122

Selected Visiting Positions

Academia Sinica, Taipei, Taiwan.
7 months from December 2026 (expected)

Hong Kong University of Science and Technology, Hong Kong, China.
5 weeks in 2026 (expected)

Kavli IPMU, the University of Tokyo, Japan.
(two visits in 2026 (3 weeks + 4 weeks (expected)), 6 weeks in 2025, 5 weeks in 2024, 5 weeks in 2023)

Université de Strasbourg, France.
(4 weeks in 2026, 2 weeks in 2025, 2 weeks in 2022, 2 weeks in 2021, 2 weeks in 2018)

ICMAT & UAM, Madrid, Spain.
(4 weeks in 2025, 5 weeks in 2023)

MIT, USA.
(2 weeks in 2024, 2 weeks in 2017)

SISSA, Trieste, Italy.
(3 weeks in 2023, 6 weeks in 2017, 4 weeks in 2016, 9 weeks in 2012)

MFO, Oberwolfach, Germany.
Research in Pairs Program (2 weeks in 2022, 2 weeks in 2021)

IHÉS, France.
(8 weeks in 2021, 8 weeks in 2016, 6 weeks in 2014, 10 weeks in 2011)

SCGP, Stony Brook, USA.
Program "Geometry and Physics of Hitchin Systems" (2 weeks in 2019)

Université de Paris-Saclay, Paris, France.
(2 weeks in 2018, 5 weeks in 2017, 5 weeks in 2015)

Institut Henri Poincaré, Paris, France.
Thematic trimester devoted to "Program on the mathematics of string theory" (8 weeks in 2016)

Laboratory of Algebraic geometry and its application, SU-HSE, Moscow, Russia.
(4 weeks in 2014)

Institut Henri Poincaré, Paris, France.
Research in Paris Program "AGT conjecture on ALE spaces by means of framed sheaves" (6 weeks in 2014)

Conference Talks

2026 (expected) **Enumerative Geometry in East Asia 2026**, *Hong Kong University of Science and Technology*, China.

2026 **Geometric representation theory and related topics**, *TianYuan Mathematics Research Center (TYMRC)*, China.

2025 **WAGP2025 "Geometry and Physics of Higgs moduli"**, *ICMS-Sofia*, Bulgaria.

2025 **Representations, Moduli and Duality**, *EPFL*, Lausanne, Switzerland.

2025 **Algebraic Structures and String Theory**, *Università di Torino*, Italy.
(A 2-hour introductory talk and a 45-minute research talk)

2025 **Current trends in Calabi-Yau moduli**, *Université de Strasbourg*, France.

2024 **Enumerative Geometry in East Asia 2024**, *KIAS*, Korea.

2024 **Workshop on Representation Theory and Mathematical Physics**, *Università degli Studi di Parma*, Italy.

2024 **Hopf Algebras and Monoidal Categories**, *Università degli Studi di Ferrara*, Italy.

2024 **Algebraic structures in gauge theory and geometry**, *Lorentz Center*, Leiden, the Netherlands.

2023 **Categorified Enumerative Geometry and Representation Theory**, *EPFL*, Lausanne, Switzerland.

2023 **Motives in moduli and representation theory**, *Radboud University*, Nijmegen, the Netherlands.

2023 **Gauge Theory, Moduli Spaces and Representation Theory**, *Kavli IPMU, the University of Tokyo*, Japan.

2023 **Workshop on gauge theoretic moduli spaces and vertex algebras**, *The University of Auckland*, New Zealand.

2022 **Enumerative Invariants, Quantum Fields and String Theory Correspondences**, *Mittag-Leffler Institute*, Sweden.

2022 **Interactions between Algebraic Geometry and Noncommutative Algebra**, *MFO*, Oberwolfach, Germany.

2019 **Algebra and Representation Theory in the North**, *University of Edinburgh*, UK.

2019 **XXI Congresso dell'Unione Mathematica Italiana (Lie theory section)**, *Università degli Studi di Pavia*, Italy.

2019 **Cohomological Hall algebras in Mathematics and Physics**, *Perimeter Institute for Theoretical Physics*, Waterloo, Canada.

2018 **A conference on character varieties and quantisation**, *University of Auckland*, New Zealand.

2018 **VBAC 2018: Gauge Theory and Complex Geometry**, *CIRM*, Luminy, France.
(one-hour contributed talk)

2017 **Geometric Representation Theory**, *University of Glasgow*, UK.

2017 **Quantum groups, Special functions and Integrable Systems**, *LMPT*, Tours, France.

2017 **Hitchin Systems in Mathematics and Physics**, *Perimeter Institute for Theoretical Physics*, Waterloo, Canada.

2016 **Christmas Workshop on Quivers, Moduli Spaces and Integrable Systems**, *Università degli Studi di Genova*, Italy.

2015 **Workshop on Algebraic Varieties**, *Fields Institute*, Toronto, Canada.

2014 **Workshop on DAHA, Hall Algebras, Torus Knots and Combinatorics**, *Université de Paris-Saclay*, Paris, France.

2013 **Workshop on Algebraic Analysis and Geometry**, *Università degli Studi di Padova*, Italy.

2012 **Christmas Workshop on Moduli Spaces and Integrable Systems**, *Università degli Studi di Genova*, Italy.

2012 **String-Math 2012**, *Hausdorff Center for Mathematics*, Bonn, Germany.
(20-min contributed talk)

2012 **Workshop on Geometry, Integrability, Quantization**, *SISSA*, Trieste, Italy.

2011 **4th Workshop on Geometric Methods in Theoretical Physics**, *SISSA*, Trieste, Italy.

2010 **Workshop on Categorical Methods in Geometry and Gauge Theory**, *Chern Institute of Mathematics*, Nankai University, China.

2010 **3rd Workshop on Geometric Methods in Theoretical Physics**, *SISSA*, Trieste, Italy.

Colloquia

Academia Sinica (2026); Higher School of Economics, Moscow (2019); Hong Kong Geometry Colloquium (2018); SISSA - Trieste (2017); Kansas State University (2016); Georgia Southern University (2015)

Research Courses

2027 (expected) Course on *Bridgeland Stability Conditions and Cohomological Hall Algebras*, Academia Sinica, Taiwan

2026 (expected) 12-hour course on *Bridgeland Stability Conditions and Cohomological Hall Algebras*, Hong Kong University of Science and Technology, China

2026 7-hour course on *Cohomological Hall algebras of 1-dimensional sheaves and Yangians*, Morningside Center of Mathematics, Beijing, China

2026 8-hour course on *Bridgeland Stability Conditions and Cohomological Hall Algebras*, Université de Strasbourg, France

Seminar Talks

2026 Université de Strasbourg (Séminaire ART), Università Roma Tre (Seminario di Geometria), Friedrich-Alexander-Universität in Erlangen (Algebra Seminar), University of Edinburgh (Algebra Seminar), Kavli IPMU (Mathematics - String Theory Seminar), University of Oxford (Algebraic and Symplectic Geometry Seminar), Academia Sinica (Algebraic Geometry / Representation Theory Seminar)

2025 ICMAT (Geometry Seminar), Hong Kong University of Science and Technology (Algebra and Geometry Seminar), Università di Padova and Università di Verona (Rings, Algebras, and Moduli Seminar)

2024 Kansas State University (M-Seminar), The Galileo Galilei Institute for Theoretical Physics (Program "BPS Dynamics and Quantum Mathematics"), ICTP (Mathematics Seminar), MIT (Special Seminar), Kavli IPMU (Mathematics - String Theory Seminar)

2023 ICMAT (Geometry Seminar), SISSA - Trieste (Algebraic Geometry and Mathematical Physics Seminar), Università di Milano La Statale (Incontri di geometria algebrica ed aritmetica Milano - Pisa), Università di Modena e Reggio Emilia (Algebra Seminar)

2022 Jagiellonian University (Algebra Seminar), Universidad Nacional de Colombia (Algebraic Geometry Seminar), Università di Roma La Sapienza (Algebra and Geometry Seminar), Università di Bologna (Algebra and Geometry Seminar), Virginia Commonwealth University (Geometry and Topology Seminar)

2021 UC Davis (Algebraic Geometry Seminar), Freie Universität Berlin (Algebraic Geometry and Complex Analysis Seminar)

2020 The RepNet Virtual Seminar, Università di Roma "Tor Vergata" (Algebra and Representation Theory Seminar), Università degli Studi di Bologna (Algebra and Geometry Seminar), Università di Pisa (Algebraic and Arithmetic Geometry Seminar)

2019 Università degli Studi di Firenze (Seminario di Geometria), University of Sheffield (Algebraic Geometry Seminar), University of York (Algebra Seminar), Kavli IPMU (GTM Seminar), Rutgers University (Geometry, Symmetry and Physics Seminar), Northeastern University (Geometry, Physics, and Representation Theory Seminar)

2018 University of Edinburgh (EDGE Seminar), Université de Strasbourg (Séminaire Quantique), Université de Grenoble (Séminaire de Algèbre et Géométries), Scuola Normale Superiore - Pisa, Università degli Studi di Firenze (Seminario di Geometria), Kavli IPMU (GTM Seminar)

2017 Rutgers University (Geometry, Symmetry and Physics Seminar), MIT (Geometric Representation Theory), Centre for Quantum Geometry of Moduli Spaces - Aarhus (Aarhus Differential Algebraic Geometry Seminars), Department of Physics and Astronomy - Uppsala University, Institut de Mathématiques de Jussieu and ENS - Paris (Séminaire de Géométrie Algébrique), Institut de Mathématiques de Bourgogne - Dijon (Séminaire de Géométrie et Systèmes Dynamiques), Institut Henri Poincaré - Paris (Séminaire de Géométrie et Quantification), Institut Élie Cartan de Lorraine (Séminaire de Analyse, Géométrie et Algèbre), Kavli IPMU (GTM Seminar)

2016 University of Waterloo (Geometry and Topology Seminar), Université Lille 1 (Séminaire de Géométrie Algébrique), Université d'Angers (Séminaire de Géométrie Algébrique), SISSA - Trieste (Geometry Seminar), Università degli Studi di Torino (Seminari di Algebra e Geometria Algebrica), University of British Columbia (Algebra and Algebraic Geometry Seminar), Institut de Mathématiques de Jussieu - Paris (Séminaire Groupes, Représentations et Géométrie), Université de Grenoble (Séminaire de Algèbre et Géométries)

2015 Perimeter Institute for Theoretical Physics (Geometric Representation Theory Seminar), Fields Institute - Toronto (Geometric Representation Theory Seminar), University of Pennsylvania (Math-Physics Joint Seminar), Rutgers University (Geometry, Symmetry and Physics Seminar), University of Western Ontario (Geometry and Topology Seminar, Noncommutative Geometry Seminar and Algebra Seminar)

2014 LPTHE - Université Pierre et Marie Curie - Paris, University of Waterloo (Geometry and Topology Seminar), University of Western Ontario (Geometry and Topology Seminar), SISSA - Trieste (Geometry Seminar), Laboratory of Algebraic geometry and its application - SU-HSE - Moscow (Geometric Representation Theory Seminar and Seminar on Geometric Structures on Manifolds), Université de Nice Sophia-Antipolis (Séminaire d'Algèbre, Topologie et Géométrie), University of Luxembourg (Seminar in Algebra, Geometry, and Quantization), Université de Rennes 1 (Séminaire de Géométrie Algébrique), Institut de Mathématiques de Jussieu - Paris (Séminaire Caen Cergy Clermont Paris - Théorie des Représentations and Séminaire de Géométrie Algébrique), University of Edinburgh (EDGE Seminar)

2013 Maxwell Institute for Mathematical Sciences - Edinburgh, Université d'Angers (Séminaire de Physique Mathématique), Université de Grenoble (Séminaire de Algèbre et Géométries)

2012 Maxwell Institute for Mathematical Sciences - Edinburgh, Université Lille 1 (Séminaire de Géométrie Algébrique), SISSA - Trieste (Students' Seminar in Algebraic Geometry - expository talk)

2011 Université Lille 1 (Séminaire de Géométrie Algébrique), Université d'Angers (Séminaire de Physique Mathématique), Université de Grenoble (Séminaire de Algèbre et Géométries), Université de Nantes (Séminaire de Topologie, Géométrie et Algèbre)

Organizational Activities

Thematic Program

April - June 2028 (expected) **Thematic Program "Representation Theory and Mathematical Physics"** (organized with J. Kamnitzer, L. Rybnikov, and B. Webster), *CRM Montréal*, Canada.

Conferences and Workshops

2025 **A one-day workshop on "Enumerative Geometry and Geometric Representation Theory"** (organized with M. Talpo), *Università di Pisa*, Italy.

2025 **Moduli Spaces in (Super)Geometry and Mathematical Physics (WAGP2025). A celebration of Ugo Bruzzo's 70th birthday** (organized with M. Jardim, E. Macrì, and A. Ricolfi), João Pessoa, Brazil.

2025 **Enumerative geometry, representation theory, and physics** (organized with Y. Toda and M. Yamazaki), *Kavli IPMU*, Tokyo, Japan.

2024 **Quantization in Representation Theory, Derived Algebraic Geometry, and Gauge Theory** (organized with A. Appel, L. Bossinger, G. Felder, M. Porta, and O. Schiffmann), *SwissMAP Research Station*, Les Diableretes, Switzerland.

2022 **Workshop on "Geometry and Arithmetics of Moduli Spaces"** (organized with A. Bandini, T. Szamuely, and M. Talpo), *Università di Pisa*, Italy.

2022 **"Geometric Representation Theory", virtual ICM 2022 Satellite Conference** (organized with T. Arakawa, J. Kamnitzer, H. Nakajma, M. Reineke, and V. Serganova), *Kavli IPMU*, Tokyo, Japan.
(Online conference with around 350 participants)

2022 **CIRM Workshop on "New Perspectives on Hyperkähler Manifolds". A Celebration of Dimitri Markushevich's (60+2)nd Birthday** (organized with U. Bruzzo and G. Menet), *CIRM*, Levico Terme, Italy.

2021 **Quantization in Derived Algebraic Geometry and Representation Theory** (organized with A. Appel, M. Porta, and O. Schiffmann), *BIRS - Casa Matématica Oaxaca*, Mexico.
(Cancelled due to the COVID-19 pandemic.)

2019 **Moduli spaces, Representation theory and Quantization** (organized with D. Baraglia, P. Hekmati, T. Mochizuki, and M.-H. Saito), *RIMS*, Kyoto, Japan.

2019 **Representation Theory, Gauge Theory, and Integrable Systems** (organized with H. Nakajima, Y. Tachikawa, and Y. Yoshida), *Kavli IPMU*, Tokyo, Japan.

2017 **Workshop on Higgs moduli spaces and character varieties (SWAGP2017)** (organized with U. Bruzzo, F. Rodriguez Villegas, and J. Stoppa), *SISSA*, Trieste, Italy.

2017 **Workshop "From students to mathematicians: an excellence Master program in Trieste"** (organized with D. Barilari, F. Fanelli, A. Lerario, et al.), *SISSA and Università degli Studi di Trieste*, Italy.

2016 **Hall algebras, enumerative invariants and gauge theories** (organized with J. Kamnitzer and O. Schiffmann), *Fields Institute*, Toronto, Canada.

2015 **Moduli Spaces in Algebraic Geometry and Mathematical Physics** (organized with U. Bruzzo, D.-E. Diaconescu, F. Perroni, and C. Bai), *Chern Institute of Mathematics*, Tianjin, China.

2015 **Interactions between Geometry and Physics. A conference in honor of Ugo Bruzzo's 60th birthday** (organized with M. Jardim, F. Perroni, et al.), Guarujá, São Paulo, Brazil.

2014 **Instanton Counting: Moduli Spaces, Representation Theory and Integrable Systems** (organized with U. Bruzzo, D. Markushevich, V. Rubtsov, and S. Shadrin), *Lorentz Center*, Leiden, the Netherlands.

2013 **VBAC2013 (2013 meeting of the Vector Bundles on Algebraic Curves Group). Hilbert Schemes, Sheaves and Representation Theory** (organized with U. Bruzzo, et al.), *SISSA*, Trieste, Italy.

Summer Schools

2026 **Summer School on "Perverse Sheaves and their Categorification in Geometry and Representation Theory"** (organized with G. Carnovale, W. Donovan, F. Esposito, and M. Lanini), *Venice International University*, Italy.

2025 **Summer School on "Enumerative Geometry and Geometric Representation Theory"** (organized with A. Maffei and M. Talpo), *Università di Pisa*, Italy.

2021 **IHÉS Summer School on Enumerative Geometry, Physics and Representation Theory** (organized with A. Negut and O. Schiffmann), *IHÉS*, France.
(School offered in a blended format with around 350 participants)

2018 **CIME School on Geometric Representation Theory and Gauge Theory** (organized with U. Bruzzo and A. Grassi), Cetraro, Italy.

2017 **School on Higgs moduli spaces and character varieties** (organized with U. Bruzzo, F. Rodriguez Villegas, and J. Stoppa), *SISSA*, Trieste, Italy.

Series " Researchers Meetings in Algebra and Geometry"

2026 **Researchers Meeting in Algebra and Geometry** (organized with A. Appel, A. Barbieri, C. Felisetti, L. Capuano, F. Carocci, D. Labardini Fragoso, S. Monavari, R. Svaldi, and M. Talpo), *Università degli Studi di Padova*, Italy.

2025 **Researchers Meeting in Algebra and Geometry** (organized with A. Appel, C. Felisetti, L. Capuano, F. Carocci, R. Svaldi, and M. Talpo), *Università di Modena e Reggio Emilia*, Italy.

2024 **Researchers Meeting in Algebra and Geometry** (organized with A. Appel, F. Binda, L. Pertusi, R. Svaldi, and M. Talpo), *Università di Milano La Statale*, Italy.

2023 **Researchers Meeting in Algebra and Geometry** (organized with A. Appel, F. Binda, L. Capuano, and M. Talpo), *Università di Roma 3*, Italy.

2022 **Young Researchers Meeting in Algebra and Geometry** (organized with A. Appel, A. Lerario, S. Scherotzke, N. Sibilla, and M. Talpo), *SISSA*, Trieste, Italy.

2021 **Young Researchers Meeting in Algebra and Geometry 2020** (organized with A. Appel, A. Hochenegger, M. Porta, S. Scherotzke, and M. Talpo), *Scuola Normale Superiore*, Pisa, Italy.
(Postponed from 2020 to 2021 due to the COVID-19 pandemic)

Online Seminars

2021–2021 **(Italian) Online Representation Theory Seminar** (co-organizer), *website: grt.cs.dm.unipi.it/online-representation-theory-seminar*.

2020–2021 **Geometry and Representation Theory at Home** (co-organizer), *website: grt-home.org*.

Departmental Seminars

2020–Present **Algebraic and Arithmetic Geometry Seminar** (co-organizer), *Università di Pisa*, Italy.

2020–2024 **Seminar on Combinatorics, Lie Theory, and Topology** (co-organizer), *Università di Pisa*, Italy.

2015–2016 **Geometry and Topology Seminar** (co-organizer), *University of Western Ontario*, Canada.

Supervision

PhD Students

2025–Present **Ziwei Wei**, *Università di Pisa (Italy)*.
Supported by CSC-UniPi Joint Scholarship Programme

2024–Present **Luca Morstabilini** (co-supervised with A. Ricolfi), *SISSA (Trieste, Italy)*.

2010–2013 **Mattia Pedrini** (co-supervised with U. Bruzzo), *SISSA (Trieste, Italy)*, Thesis: *Moduli spaces of framed sheaves on stacky ALE spaces, deformed partition functions and the AGT conjecture*.

Master's Degree Theses

2027 (expected) **Xuhang Zhang**, *Università degli Studi di Milano and University of Duisburg-Essen (ALGANT Master's Program)*.

2025 **Ziwei Wei**, *Università degli Studi di Trieste and SISSA (Trieste, Italy)*, Thesis: *Maulik-Okounkov's cohomological stable envelopes and Yangians*, defended in October 2025.

2024 **Anna Borri**, *Università di Pisa (Italy)*, Thesis: *Perverse coherent sheaves and derived equivalences*, defended in September 2024.

2024 **Luca Morstabilini**, *Università di Pisa (Italy)*, Thesis: *Counting indecomposable vector bundles and stable Higgs sheaves over smooth curves*, defended in February 2024.

2023 **Nicolò Bignami**, *Università di Pisa (Italy)*, Thesis: *On the Beauville-Voisin conjecture for Hilbert schemes of points on K3 surfaces*, defended in October 2023.

2023 **Davide Ferri**, *Università di Pisa (Italy)*, Thesis: *Algebraic Structures Related to The Dynamical Yang-Baxter Equation*, defended in June 2023.
joint degree with Hokkaido University, co-supervised with Y. Shibukawa.

2022 **Francesca Pratali**, *Università di Pisa (Italy)*, Thesis: *Dendroidal ∞-operads*, defended in September 2022.
co-supervised with E. Hoffbeck (Université Sorbonne Paris Nord).

Bachelor's Degree Theses

2022 **Edoardo Ciminelli**, *Università di Pisa (Italy)*, Thesis: *Rappresentazioni di gruppi di Lie compatti e il teorema di Peter-Weyl*, defended in September 2022.

2021 **Davide Chionna**, *Università di Pisa (Italy)*, Thesis: *Classificazione delle algebre di Lie semisemplici su campi algebricamente chiusi*, defended in September, 2021.

2021 **Nicolò Bignami**, *Università di Pisa (Italy)*, Thesis: *Rappresentazioni di quivers e teorema di Gabriel*, defended in September, 2021.

2021 **Chiara Valentina Gaetano**, *Università di Pisa (Italy)*, Thesis: *Fibrati vettoriali, classi di Chern e la loro relazione con la coomologia della Grassmanniana*, defended in May, 2021.

Participation in PhD Activities

Doctoral Programs

2023–Present **Board of the PhD Program** (member), *Università di Pisa*, Italy.

2023–Present **PhD Program Review Committee** (member), *Università di Pisa*, Italy.

PhD Defense Committee Member

2024 **Qiangru Kuang**, *SISSA - Trieste*, Italy.

2024 **Robert Hanson**, *Instituto Superior Técnico, Universidade de Lisboa*, Portugal.

2021 **Lucien Hennecart**, *Université de Paris-Saclay*, Paris, France.

PhD Thesis External Evaluator

2024 **Qiangru Kuang**, *SISSA - Trieste*, Italy.

Teaching

PhD Level Courses

2025 **Derived categories and applications to Geometric Representation Theory**, Università di Pisa, Italy.

2024 **Quotients and moduli spaces**, Università di Pisa, Italy.
Taught together with Mattia Talpo

2021 **Yangians in geometry and representation theory**, Università di Pisa, Italy.
Joint course with Università di Parma and Università di Roma Tor Vergata, taught together with Andrea Appel and Martina Lanini

2009–2010 **Sheaf theory and metrics on fiber bundles**, *(Teaching assistant)*, SISSA, Italy.

Master Level - Università di Pisa, Italy

2025–2026 **Representation Theory A**.
Laurea Magistrale in Matematica

Bachelor Level - Università di Pisa, Italy

2025–2026 **Analisi Matematica 1**, *(Calculus I for Engineers)*.
Laurea Triennale in Ingegneria Biomedica

2024–2025 **Analisi Matematica 1**, *(Calculus I for Engineers)*.
Laurea Triennale in Ingegneria Biomedica

2023–2024 **Analisi Matematica 1**, *(Calculus I for Engineers)*.
Laurea Triennale in Ingegneria Biomedica

2022–2023 **Analisi Matematica 1**, *(Calculus I for Engineers)*.
Laurea Triennale in Ingegneria Biomedica

2021–2022 **Analisi Matematica 1**, *(Calculus I for Engineers)*.
Laurea Triennale in Ingegneria Biomedica

2020–2021 **Analisi Matematica 1**, *(Calculus I for Engineers)*.
Laurea Triennale in Ingegneria Biomedica

2019–2020 **Geometria 2**, *(Topics: general topology, fundamental group, and complex analysis)*.
Laurea Triennale in Matematica

Bachelor Level - University of Western Ontario, Canada

2016 **Math 1228 B**, *Methods of Finite Mathematics*.

2015 **Math 1229 A**, *Methods in Matrix Algebra*.

2015 **Calculus 1301 B**, *Calculus II*.

2014 **Math 1229 A**, *Methods in Matrix Algebra*.

Bachelor Level - Università degli Studi di Trieste, Italy

2010–2011 **Algebra I**, *(Teaching assistant)*.
Laurea Triennale in Matematica

Reading Courses

2024–2025 **Sheaves in geometry**, Università di Pisa, Italy.
organized with A. Maffei and L. Patimo

2023–2024 **Representations of Lie algebras in the category $\mathcal{O}$**, Università di Pisa, Italy.
organized with A. Maffei

Other Academic Activities

Referee

Adv. Math., Algebr. Represent. Theory, Bull. Sci. Math., Comm. Math. Phys., Doc. Math., Duke Math. J., Épijournal Geom. Algébrique, Int. Math. Res. Not. IMRN, J. Algebra, J. Algebraic Geom., J. Geom. Phys., J. Inst. Math. Jussieu, J. Pure Appl. Algebra, J. Reine Angew. Math. Crelle's Journal, J. Topology, Lett. Math. Phys., Math. Res. Lett., Math. Z., MEMS, Proc. Edinburgh Math. Soc., Sel. Math. New Ser., Mosc. Math. J., SIGMA, Tunis. J. Math.

Reviewer

Research Grants Council (RGC) of Hong Kong (2026, 2025), ANR (2024), NWO Talent Program (2022)

University and Departmental Services

2024–Present **Third Mission Committee** (member), *Università di Pisa*, Italy.

2023–Present **Computing Facility Committee** (member), *Università di Pisa*, Italy.

2023–Present **Department's website content maintainer**, *Università di Pisa*, Italy.

2023–2025 **Tutoring Committee at the School of Engineering of the University of Pisa** (member), *Università di Pisa*, Italy.

2021–2023 **Department Colloquium Committee** (member), *Università di Pisa*, Italy.

2014–2015 **International Postdoctoral Representative at the Postdoctoral Association at Western**, *University of Western Ontario*, Canada.

2008–2011 **Students' Representative at the Mathematical Physics Sector**, *SISSA*, Trieste, Italy.

2006–2008 **Students' Representative at the Dipartimento di Matematica**, *Università degli Studi di Trieste*, Italy.

Memberships

2009–Present **GNSAGA–INdAM**.

Languages

Italian	Mother tongue
English	Fluent knowledge
French	Fair knowledge
Spanish	Fluent knowledge

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