

## FRANCESCO SALA

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Citizenship: Italian  
Date of birth: November 11th, 1983  
Place of birth: Altofonte (PA), Italy

### CURRENT POSITION

Kavli IPMU, Japan  
**Postdoctoral Fellow** November 2016 - present

### EMPLOYMENTS

University of Western Ontario, London, Canada  
**Postdoc** (Assistant Professor and Postdoctoral Fellow) August 2014 - July 2016  
Heriot-Watt University, Edinburgh, United Kingdom  
**Postdoctoral Research Associate** to Prof. R. J. Szabo March 2012 - February 2014

### EDUCATION

International School for Advanced Studies (SISSA), Trieste, Italy and Université Lille 1, France  
**Ph.D. in Geometry and Doctorat en Mathématiques** October 2011  
**Pures (co-tutorial thesis)**  
Supervisors: U. Bruzzo and D. Markushevich  
Università degli Studi di Trieste, Italy  
**Laurea Specialistica (Master Degree) in Mathematics** October 2008  
**(in collaboration with SISSA)**  
Università degli Studi di Palermo, Italy  
**Laurea (Bachelor Degree) in Mathematics** July 2006

### ADDITIONAL DIPLOMA

SISSA, Trieste, Italy  
**Diploma “Percorso Formativo Comune”** October 2008

### RESEARCH INTERESTS

Moduli spaces of sheaves, quiver varieties, geometric representation theory, quantum groups, Hall algebras, mathematical physics, gauge theory

### PUBLICATIONS

8. P. Eyssidieux and **F. Sala**. Instantons and framed sheaves on Kähler Deligne-Mumford stacks. *Annales de la Faculté des Sciences de Toulouse*, to appear.
7. M. Pedrini, **F. Sala** and R. J. Szabo. AGT relations for abelian quiver gauge theories on ALE spaces. *Journal of Geometry and Physics*, 2016, 103, 43-89.
6. U. Bruzzo, M. Pedrini, **F. Sala** and R. J. Szabo. Framed sheaves on root stacks and supersymmetric gauge theories on ALE spaces. *Advances in Mathematics*, 2016, 288, 1175–1308.
5. U. Bruzzo and **F. Sala**. Framed sheaves on projective stacks. *Advances in Mathematics*, 2015, 272, 20-95.

4. U. Bruzzo, **F. Sala** and R. J. Szabo.  $\mathcal{N} = 2$  quiver gauge theories on A-type ALE spaces. *Letters in Mathematical Physics*, 2015, 105, no. 3, 401-445.

3. **F. Sala**. Restriction theorems for  $\mu$ -(semi)stable framed sheaves. *Journal of Pure and Applied Algebra*, 2013, 217, no. 12, 2320-2344.

2. **F. Sala**. Symplectic structures on moduli spaces of framed sheaves on surfaces. *Central European Journal of Mathematics*, 2012, 10, no. 4, 1455-1471.

1. **F. Sala**. Some topics in the geometry of framed sheaves and their moduli spaces. Ph.D. Dissertation. SISSA, Trieste, Italy and Université Lille 1, France (2011).

## ARTICLES IN PREPARATION

**F. Sala** and O. Schiffmann. K-theoretic and Cohomological Hall algebras of Higgs sheaves on a curve.

**F. Sala** and O. Schiffmann. Hall algebras of orbifold curves.

A. Boralevi and **F. Sala**. Moduli spaces of torsion-free sheaves on partial desingularizations of toric singularities and quiver varieties.

U. Bruzzo, E.-D. Diaconescu and **F. Sala**. Euler characteristics of moduli spaces of framed sheaves on root stacks over ruled surfaces.

## EDITORIAL WORK

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*

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

## VISITING POSITIONS

21. SISSA, Trieste, Italy. (6 weeks)	June and July 2017 (expected)
20. Centre for Quantum Geometry of Moduli Spaces, Aarhus, Denmark. (1 week)	June 2017 (expected)
19. Université de Paris-Sud, Paris, France. (3 weeks)	May 2017 (expected)
18. Université de Paris-Sud, Paris, France. (2 weeks)	February 2017
17. University of Waterloo, Canada. (1 week)	November 2016
16. IHÉS, France. (8 weeks)	September 2016 - October 2016
15. SISSA, Trieste, Italy. (4 weeks)	July 2016
14. Institut Henri Poincaré, Paris, France. (8 weeks) Thematic trimester devoted to "Program on the mathematics of string theory"	May 2016 - June 2016
13. Université de Paris-Sud, Paris, France. (1 week)	February 2016
12. Université de Paris-Sud, Paris, France. (5 weeks)	April 2015 - May 2015
11. Rutgers University, USA. (1 week)	February 2015
10. LPTHE, Université Pierre et Marie Curie, Jussieu, Paris, France. (1 week)	December 2014
9. Laboratory of Algebraic geometry and its application, SU-HSE, Moscow, Russia. (4 weeks)	June 2014
8. IHÉS, France. (6 weeks)	March 2014 - May 2014
7. Institut Henri Poincaré, Paris, France. (6 weeks) Research in Paris Program "AGT conjecture on ALE spaces by means of framed sheaves"	February 2014 - March 2014
6. SISSA, Trieste, Italy. (3 weeks)	December 2012

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| 5. SISSA, Trieste, Italy. (6 weeks)           | January 2012 - February 2012 |
| 4. IHÉS, France. (10 weeks)                   | November 2011 - January 2012 |
| 3. Université Lille 1, France. (16 weeks)     | February 2011 - May 2011     |
| 2. University of Pennsylvania, USA. (3 weeks) | December 2010                |
| 1. Université Lille 1, France. (12 weeks)     | April 2010 - June 2010       |

## CONFERENCE TALKS

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|---|---------------------------------|
| 15. University of Glasgow, UK<br><i>Geometric Representation Theory</i>   | July 3rd - 7th 2017 (expected)  |
| 14. LMPT Tours, France<br><i>Quantum groups, Special functions and Integrable systems</i>                                 | May 17th - 19th 2017 (expected) |
| 13. Perimeter Institute, Waterloo, Canada<br><i>Hitchin Systems in Mathematics and Physics</i>                            | February 13th - 17th 2017       |
| 12. Università degli Studi di Genova, Italy<br><i>Christmas Workshop on Quivers, Moduli Spaces and Integrable Systems</i> | December 19th - 21st 2016       |
| 11. Fields Institute, Toronto, Canada<br><i>Workshop on Algebraic Varieties</i>   | November 21st - 22nd 2015       |
| 10. Fields Institute, Toronto, Canada<br><i>Workshop on Algebraic Varieties</i>   | March 7th - 8th 2015            |
| 9. Université de Paris-Sud, Paris, France<br><i>Workshop on DAHA, Hall Algebras, Torus Knots and Combinatorics</i>        | November 17th - 20th 2014       |
| 8. Università degli Studi di Padova, Italy<br><i>Workshop on Algebraic Analysis and Geometry</i>                          | September 23rd - 24th 2013      |
| 7. Università degli Studi di Genova, Italy<br><i>Christmas Workshop on Moduli Spaces and Integrable Systems</i>           | December 19th - 21st 2012       |
| 6. Hausdorff Center for Mathematics, Bonn, Germany<br><i>Workshop "String-Math 2012" (contributed talk)</i>               | July 16th - 21st 2012           |
| 5. SISSA, Trieste, Italy<br><i>Workshop on Geometry, Integrability, Quantization</i>                                      | July 9th - 12th 2012            |
| 4. SISSA, Trieste, Italy<br><i>Workshop Einstein at SISSA 2011</i>  | July 6th - 12th 2011            |
| 3. SISSA, Trieste, Italy<br><i>Workshop TULSF VI</i>  | September 24th 2010             |

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

August 29th - September 3rd 2010

**1.** SISSA, Trieste, Italy  
*Workshop Einstein at SISSA 2010*

June 5th - 9th 2010

## SEMINAR TALKS

2017

Centre for Quantum Geometry of Moduli Spaces - Aarhus (Aarhus Differential Algebraic Geometry Seminars — expected), Department of Physics and Astronomy - Uppsala University (expected), 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), Kansas State University (Colloquium)

2015

Perimeter Institute for Theoretical Physics (Geometric Representation Theory Seminar), Fields Institute - Toronto (Geometric Representation Theory Seminar), Georgia Southern University (Colloquium), 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)

2010

University of Pennsylvania (Math-Physics Joint Seminar)

## ORGANIZATIONAL ACTIVITIES

**8.** Organizer (with U. Bruzzo and A. Grassi) of the *CIME School on Geometric Representation Theory and Gauge Theory*

- Cetraro (CS), Italy June 25th - 29th 2018 (expected)
- 7.** Organizer (with U. Bruzzo, F. Rodriguez Villegas and J. Stoppa) of the *School and Workshop on Higgs moduli spaces and character varieties (SWAGP2017)*  
SISSA, Trieste, Italy June 19th - 23rd 2017 (expected)
- 6.** Organizer (with D. Barilari, F. Fanelli and A. Lerario) of the Workshop *From students to mathematicians: an excellence Master program in Trieste*  
SISSA and Università degli Studi di Trieste, Trieste, Italy June 14th - 16th 2017 (expected)
- 5.** Organizer (with J. Kamnitzer and O. Schiffmann) of the *Workshop on Hall algebras, enumerative invariants and gauge theories*  
Fields Institute, Toronto, Canada November 14th - 18th 2016
- 4.** Organizer (with U. Bruzzo, E.-D. Diaconescu, F. Perroni and C. Bai) of the *Workshop on Moduli Spaces in Algebraic Geometry and Mathematical Physics*  
Chern Institute of Mathematics, Nankai University, China September 14th - 18th 2015
- 3.** Organizer (with M. Jardim, F. Perroni et al.) of the *Workshop on Interactions between Geometry and Physics, a conference in honor of Ugo Bruzzo's 60th birthday*  
Guarujá, São Paulo, Brazil August 17th - 21st 2015
- 2.** Organizer (with U. Bruzzo, D. Markushevich, V. Rubtsov and S. Shadrin) of the *Workshop on Instanton Counting: Moduli Spaces, Representation Theory and Integrable Systems*  
Lorentz Center, Leiden, The Netherlands June 16th - 20th 2014
- 1.** Organizer (with U. Bruzzo et al.) of the *VBAC2013 (2013 meeting of the Vector Bundles on Algebraic Curves Group) Hilbert Schemes, Sheaves and Representation Theory*  
SISSA, Trieste, Italy June 17th - 21st 2013

## FELLOWSHIPS, GRANTS

- 15.** IHÉS, France  
Visiting Position Fellowship September 2016 - October 2016
- 14.** SISSA, Trieste, Italy  
Visiting Position Fellowship July 2016
- 13.** Institut Henri Poincaré, Paris, France  
Visiting Position Fellowship for a thematic trimester founded by Foundation Mathématiques de Paris May 2016 - June 2016
- 12.** Foundation Compositio Mathematica  
Conference Grant 2016  
*Workshop on Hall algebras, enumerative invariants and gauge theories*, Fields Institute, Toronto, Canada
- 11.** Foundation Compositio Mathematica  
Conference Grant 2015  
*Workshop on Moduli spaces in Algebraic Geometry and Mathematical Physics*, Chern Institute of Mathematics, Nankai University, China
- 10.** Laboratory of Algebraic geometry and its application, SU-HSE, Moscow, Russia  
Visiting Position Fellowship June 2014
- 9.** IHÉS, France  
Visiting Position Fellowship March 2014 - May 2014
- 8.** Institut Henri Poincaré, Paris, France  
Research in Paris Fellowship February 2014 - March 2014
- 7.** The Leverhulme Trust, United Kingdom  
Postdoctoral Research Associate Fellowship March 2012 - February 2014
- 6.** SISSA, Trieste, Italy  
Visiting Position Fellowship January 2012 - February 2012

5. IHÉS, France  
Visiting Position Fellowship November 2011 - January 2012
4. SISSA, Trieste, Italy  
Ph.D. Student Fellowship November 2008 - October 2011
3. GREFI-GRIFGA, INDAM, Italy  
Visiting Student Fellowship February 2011 - April 2011
2. SISSA, Trieste, Italy  
Erasmus Placement Fellowship February 2011 - April 2011
1. SISSA, Trieste, Italy  
Borsa di Studio *Percorso Formativo Comune* October 2006 - September 2008

## PHD STUDENT

Mattia Pedrini (2010 - 2013, SISSA, Trieste, Italy, with Ugo Bruzzo) Thesis defended in October 2013  
Title: “*Moduli spaces of framed sheaves on stacky ALE spaces, deformed partition functions and the AGT conjecture*”

## TEACHING EXPERIENCE

- Instructor.** University of Western Ontario, Canada 2014 - 2016
- Math 1228 B: Methods of Finite Mathematics. Winter 2016
  - Math 1229 A: Methods in Matrix Algebra. Fall 2015
  - Calculus 1301 B: Calculus II. Winter 2015
  - Math 1229 A: Methods in Matrix Algebra. Fall 2014
- Teaching Assistant.** Trieste, Italy 2009 - 2011
- Algebra I, 2010 - 2011, at Università degli Studi di Trieste
  - Sheaf theory and metrics on fiber bundles, 2009 - 2010, at SISSA, Trieste, Italy

## OUTREACH ACTIVITIES

SISSA, Trieste, Italy September 23rd 2011  
**Collaborator** for the event *Notte dei Ricercatori 2011: STAR - Science Trieste And Researchers*

Università degli Studi di Trieste, Italy September 2007  
**Co-director** of the video *Perché io ho scelto la matematica? (Why have I chosen to study Maths?)*, shown during the final meeting of the biennial project “*Lauree scientifiche - Orientamento e formazione degli insegnanti - Matematica*”

## OTHER ACADEMIC ACTIVITIES

- Referee** for Bull. Sci. Math., Int. Math. Res. Not. IMRN, J. Algebraic Geom., J. Geom. Phys., J. Pure Appl. Algebra, Lett. Math. Phys., SIGMA
- Committee Member:**  
Young Scientist Award, supported by Elsevier Publishing House, in honor of U. Bruzzo’s 60th anniversary. September 2015
- Coordinator:**  
Geometry and Topology Seminar (with R. Jardine). Department of Mathematics, University of Western Ontario, Canada. 2015 - 2016
- University and Departmental Services:**
- University of Western Ontario, Canada October 2014 - June 2015  
**International Postdoctoral Representative** at the Postdoctoral Association at Western
  - SISSA, Trieste, Italy December 2008 - October 2011  
**Students’ Representative** at the Mathematical Physics Sector

- Università degli Studi di Trieste, Italy  
**Students' Representative** at the Dipartimento di Matematica

October 2006 - October 2008

**Reviewer** for Mathematical Reviews

**Member** of

- GNSAGA-INdAM
- research project PRIN *Geometria delle varietà algebriche e dei loro spazi di moduli*, co-funded by MIUR (cofin 2008). November 2008 - October 2011

#### LANGUAGES

**Italian:** Mother tongue. **English:** Fluent knowledge. **French:** Fluent knowledge **Spanish:** Fair knowledge.

Updated on May 7th, 2017