



Luca CASARIN  
Rome/Italy | Piazzale Aldo Moro 5  
luca.casarin@uniroma1.it

## SUMMARY

---

I am a post-doc in mathematics currently living and working in Rome. My main research interests are: representation theory, Lie algebras, algebraic geometry, vertex algebras, chiral and factorization algebras and the geometric Langlands program.

## EDUCATION

---

### BACHELOR IN MATHEMATICS

03/10/2016-12/07/2019

UNIVERSITY OF PISA

- Final grade : 110 with honors / 110 – EQF level 6
- Thesis: Holomorphic connections on Riemann surfaces

### MASTER IN MATHEMATICS

25/07/2019-24/09/2021

UNIVERSITY OF PISA

- Final grade : 110 with honors/110 - EQF level 7
- Thesis: The center of the enveloping algebra of an affine Kac-Moody algebra

### "DIPLOMA DI LICENZA" IN MATHEMATICS

03/10/2016-22/12/2022

SCUOLA NORMALE SUPERIORE

- Final grade : 110 with honors/110 - EQF level 7

### PHD IN MATHEMATICS

01/11/2021 - 22/01/2025

UNIVERSITY OF ROME 1 "LA SAPIENZA"

- EQF level 8

## CONFERENCES AND INVITED TALKS

---

### CARE CONFERENCE

27-31 October 2025

ENS LYON

- Together with Alice Bouillet, Luca Francone, Matilde Maccan and Tal Gottesman, I organized the CARE conference in Lyon. Its goal is to bring together young researchers in Representation Theory, Algebraic Geometry and Algebra in a wide sense not only to do mathematical research but also to reflect on various ethical topics of our field. For more info: [CARE website](#)

### CYCLE OF SEMINARS

2020/2021

UNIVERSITY OF PISA / ONLINE MEETINGS

- I held various lectures in the 2020/2021 Lie theory cycle of seminars, with a working group at the University of Pisa interested in vertex algebras. I have held 9 seminars about the description of the center of the enveloping algebra of an affine Kac-Moody algebra. This was also the subject of my master thesis, the main bibliographical reference is: E. Frenkel "Langlands Correspondence for Loop Groups".

### INVITED TALKS: "A FEIGIN FRENKEL THEOREM WITH $n$ SINGULARITIES"

08/09/2022 - 30/05/2023 - 06/06/2023

UNIVERSITY OF ROME 1 "LA SAPIENZA", UNIVERSITY OF BOLOGNA

- I held various seminars in different occasions where I explained the results of my article "A Feigin Frenkel theorem with  $n$  singularities". Respectively: at an international event on infinite dimensional Lie algebras held in Rome, during the conference "Interactions between Mathematics and Physics" in honor of Victor J. Kac and finally at the algebra and geometry seminar at the University of Bologna.

### INVITED TALK: "AFFINE ALGEBRAS WITH MULTIPLE SINGULARITIES AND DISTRIBUTIONS"

12/12/2023

INDAM WORKSHOP: VERTEX ALGEBRAS AND INFINITE DIMENSIONAL LIE ALGEBRAS

**INVITED TALK: "A TOUR IN THE REP. THEORY OF KAC-MOODY ALGEBRAS AT THE CRITICAL LEVEL"** 19/12/2023

WINTER MEETING IN ALGEBRA AND GEOMETRY IN ROME 2023

**INVITED TALK: "HOMOLOGICAL METHODS IN SEMI-INFINITE CONTEXTS"** 19/06/2024

UNIVERSITY OF FLORENCE

**INVITED TALKS: "THE FACTORIZABLE FEIGIN-FRENKEL CENTER"** 02/10/2024

- WORKSHOP IN PARMA: "NEW PERSPECTIVES IN YANGIANS AND QUANTUM AFFINE ALGEBRAS";
- FINAL PRIN PROJECT MEETING: "ALGEBRAIC AND GEOMETRIC ASPECTS OF LIE THEORY"(PISA).

**ORGANIZER OF THE Y.A.M.S. SEMINARS** April 2023/ongoing

UNIVERSITY OF ROME 1 "LA SAPIENZA"

- I am the co-organizer of a cycle of seminars held in University of Rome 1. This is dedicated to P.h.D. students and young researchers interested in a large number of topics in algebra.

## SELECTED PAPERS

---

**A FEIGIN-FRENKEL THEOREM WITH  $n$  SINGULARITIES** [Advances in Mathematics, Vol. 434](#)

- I extend the Feigin-Frenkel theorem, which describes the center of the enveloping algebra at the critical level, to a setting with  $n$  singularities, showing factorization compatibility with the original Feigin-Frenkel isomorphism.

**A NOTE ON THE BUNDLE UNDERLYING OPERS** [arXiv preprint](#)

- This is a note in which I wrote the proof of a well known fact: that for any simple Lie algebra, the bundle underlying any Oper on a fixed smooth curve is the same and it is induced by the torsor of coordinates.

**TOPOLOGICAL SHEAVES AND SPACES OF DISTRIBUTIONS IN THE GLOBAL SETTING** [arXiv preprint](#)

- This is a joint work with Andrea Maffei. We extend the theory of fields/distributions appeared in the paper "A Feigin-Frenkel theorem with  $n$  singularities to a general base scheme. In order to do so we develop some theory of topological sheaves on schemes.

**THE FACTORIZABLE FEIGIN-FRENKEL CENTER** [arXiv preprint](#)

- This is a joint work with Andrea Maffei. Where we use the tools developed in "Topological sheaves and spaces of distributions in the global setting" to prove a factorizable enhancement of the Feigin-Frenkel theorem on the center of the enveloping algebra of an affine Kac-Moody algebra at the critical level.

## ACADEMIC VISITS

---

**VISITING STUDENT AT MPIM-BONN** 01/09/2023 - 30/09/2023

MAX PLANCK INSTITUTE FOR MATHEMATICS / BONN / GERMANY

- I spent a month as a visiting student at the Max Planck Institute for Mathematics in Bonn under the supervision of Professor Dennis Gaitsgory.

**VISITING STUDENT AT UNIVERSITY OF TORONTO** 23/11/2024 - 07/12/2024

UNIVERSITY OF TORONTO / TORONTO / CANADA

- I spent two weeks as a visiting student at the University of Toronto under the supervision of Professor Nick Rozenblyum.

**VISITING AT IMPA** 22/11/2025 - 13/12/2025

IMPA / RIO DE JANEIRO / BRAZIL

- I spent three weeks visiting IMPA to collaborate with Professor Reimundo Heluani and Juan Gabriel Guzman

## WORK EXPERIENCE

---

**SCHOOL COURSE TEACHER** 12/03/2025 - 29/05/2025

LICEO TALETE / ROME / ITALY

- I held a 25-hours long course in an High School in Rome, which was addressed to last year students in preparation of their final exam.

**TEACHING ASSISTANT - MATHEMATICS 2** 11/09/2023 - 02/12/2023

LUISS UNIVERSITY / ROME / ITALY

- I tutored second year students of economy for a linear algebra course. My main duties were holding classes in which I explained how to solve exercises and exam preparation and correction.

### TEACHING ASSISTANT - MATHEMATICS 2

11/09/2024 - 24/01/2025

LUISS UNIVERSITY / ROME / ITALY

- I tutored second year students of economy for a linear algebra course. My main duties were holding classes in which I explained how to solve exercises and exam preparation and correction.

### TEACHING ASSISTANT - MATHEMATICS 1

11/09/2025 - ongoing

LUISS UNIVERSITY / ROME / ITALY

- I tutored first year students of economy for an introductory calculus course. My main duties were holding classes in which I explained how to solve exercises and exam preparation and correction.

### CLASS TUTOR - ALGEBRA 1

12/10/2020 - 19/02/2021

UNIVERSITY OF PISA / PISA / ITALY

- I tutored second year students of mathematics for the course "Algebra 1". I had two main activities. The first one was to do a weekly class in which I solved problems proposed by the professors and in which I discussed the various issues the students encountered during the week. My main focus was to suggest new ways to approach mathematical problems and how to formally write solutions. As my second duty I had to correct one among three exercises in two different exam papers.

### CLASS TUTOR - GEOMETRY 1

06/04/2022 - 10/06/2022

UNIVERSITY OF ROME 1 "LA SAPIENZA" / ROME / ITALY

- I tutored first year students in mathematics for the course "Geometry 1". The main task required was to keep a weekly class in which I solved the exercises that troubled the students the most.

### INTERN

DARK SPHERE - GAME SHOP / LONDON / ENGLAND

- I spent a month in London with a summer exchange program. The first week I attended an English course while the other three weeks I was assigned to work in a game shop in the city. I did various activities, such as helping as a programming advisor and contacting other shops to organize events. This experience not only introduced me to the working environment but also greatly improved my confidence with English.

## HONORS AND AWARDS

---

### ITALIAN MATHEMATICAL OLYMPIADS

- I participated in various competitions in the Mathematical Olympiad organized in Italy. During the academic year 2015/2016 I arrived first place both in my school competition and in the province level. The same year I won a bronze medal at the national Olympiads.

### ITALIAN PHYSICS OLYMPIADS

2016

- I participated in the Italian Physics Olympiads and won the silver medal at the national competition.

### GUSTAVO MEZZETTI AWARD - BEST MASTER THESIS IN ALGEBRA

2021

UNIVERSITY OF PADOVA / ITALY

- I was awarded the first edition of the prize named after Gustavo Mezzetti, from the mathematics department of the University of Padova. The prize was for the best master thesis in Algebra in the academic year 2020/2021.

## LANGUAGE SKILLS

---

**ENGLISH** *Listening* C1 | *Reading* C2 | *Writing* C1 | *Spoken production* C1 | *Spoken interaction* C1

**FRENCH** *Listening* B1 | *Reading* B1 | *Writing* B1 | *Spoken production* B1 | *Spoken interaction* B1

**ITALIAN** *Mother tongue*

## EXTRA

---

- **Volunteering:** I am part of the volunteering organization "La Scuoletta", based in Rome since January 2023. We offer free educational level for kids of our neighborhood of ages ranging between 6 to 14 years old.
- **Music:** I love to play and listen to music. I play the guitar and the saxophone. I played in various local shows both as a guitarist and a saxophonist.

- **Web developing:** I worked to completely redesign from scratch the website of a beer-related objects collector. Alongside the web design itself the process involved learning HTML,CSS3 as main programming languages as well as a little of JavaScript. [collezionandobirra.com](http://collezionandobirra.com)
- **Abroad experiences:** I participated in the Erasmus program and spent five months in Rennes in France. It was an enriching experience where I had the opportunity to learn how my subject is taught in a different country and to meet both local and international people.