RICARDO JESÚS PALOMINO PIEPENBORN

Email: ricardo.palomino@rjpp.net Latest CV update: Sep. 30, 2025

Homepage: rjpp.net

RESEARCH

Algebra and model theory of lattice-ordered structures (in particular abelian groups, modules, and rings of functions) with emphasis on those arising in real algebra, as well as connections with spectral spaces.

EDUCATION

PhD in Mathematical Logic

Sep. 2020 - Dec. 2024

 $University\ of\ Manchester$

Manchester, UK

Thesis: Contributions to the Model Theory of Lattice-Ordered Algebras

Supervisor: Marcus Tressl

MMath Mathematics University of Manchester

Sep. 2016 - May 2020

Manchester, UK

Graduation Honours: First Class

MMath project: Regular Categories and Regular Logic

MMath project supervisor: Mike Prest

PREPRINTS AND WORK IN PROGRESS

Preprints

1. Model theory of local real closed SV-rings of finite rank. ArXiv.

Work in progress

- 1. (with Marcus Tressl) Cross-sections of real closed rings.
- 2. (with Jean Cerqueira Berni, Jorge Guier Acosta, Hugo Luiz Mariano, and Marcus Tressl) C^{∞} -rings, real closed rings, and Nash rings.

Talks and Posters

Invited Conference and Seminar Talks	
Local real closed SV-rings of finite rank and their model theory Manchester Logic Seminar, University of Manchester	15th May 2024
Relative quantifier elimination for lattice-ordered modules of continuous semi-algebraic functions on a curve (slides) LYMoTS, University of Central Lancashire	15th Apr. 2024
Relative quantifier elimination for lattice-ordered modules of continuous semi-algebraic functions on a curve (slides) London Logic Seminar, Imperial College London	29th Nov. 2023
Relative quantifier elimination for lattice-ordered modules of continuous semi-algebraic functions on the line Caserta Logic Seminar, Università degli Studi della Campania Luigi Vanvitelli	8th Jun. 2022
Contributed Conference and Seminar Talks/Posters	
Local real closed SV-rings of finite rank and their model theory (slides) OAL 2025, Florida Atlantic University	10th May 2025

Graduate teaching assistant University of Manchester (Manchester, UK)	Sep. 2019 - May 2024
University Level	
Teaching	
Category theory: origins, motivation, and basic definitions MSc Pure Mathematics Seminar	6th Feb. 2020
Regular categories and regular logic Student Logic Seminar	11th May 2020
A spectral space tour (slides) Pure Postgraduate Seminar	5th Feb. 2021
Spectral spaces in model theory (slides) Student Logic Seminar	1st Mar. 2021
The real spectrum Student Logic Seminar	11th Oct. 2021
Lattice-valued real closed rings Student Logic Seminar	3rd Mar. 2022
Lattice-ordered groups Pure Postgraduate Seminar	1st Apr. 2022
A tour through model-theoretic interpretations Pure Postgraduate Seminar	3rd Mar. 2023
Real closed valuation rings Student Logic Seminar	18th Apr. 2023
Real closed valued fields via tame pairs Student Logic Seminar	14th Feb. 2024
Student Seminar Talks at The University of Manchester	
(poster, available here) Real closed rings: an overview Mathematics Research Students' Conference, University of Manchester	1st Oct. 2021
Relative quantifier elimination for lattice-ordered modules of continuous semi-algebraic functions on the line Joint LYMOTS/SEEMOD meeting, University of Manchester	29th Jun. 2022
(poster, available here) Relative quantifier elimination for lattice-ordered modules of continuous semi-algebraic functions on a real closed field Practical and Structural Model Theory Workshop, University of Leeds	25th - 29th Jul. 2022
(poster, available here) Relative quantifier elimination for lattice-ordered modules of continuous semi-algebraic functions on a real closed field Model Theory Conference in Celebration of Ludomir Newelski's 60th Birthday, Będlewo	16th - 22nd Dec. 2022 o
Elementary classes of real closed SV-rings British Postgraduate Model Theory Conference, University of Leeds	20th Jan. 2023
Transferring properties between mathematical structures via model theory (Prezi slides) Mathematics Research Students' Conference, University of Manchester	29th Sep. 2023
Relative quantifier elimination for lattice-ordered modules of continuous semi-algebraic functions on a curve (slides) OAL-RAG 2024, Louisiana State University	10th May 2024
Local real closed SV-rings of finite rank (slides) 75th British Mathematical Colloquium, University of Manchester	19th Jun. 2024

- Tutorials (~ 50 students): Sequences and Series (2022), Introduction to Mathematical Logic (2021), Mathematical Workshop (2020), Mathematical Logic (2020), and Combinatorics and Graph Theory (2019).
- Supervisions (~ 15 students; leading problem sessions and weekly marking): Calculus and Applications (2022), Linear Algebra (2020), and Foundation of Pure Mathematics (2019 and 2021).
- Coursework marking: Algebraic Structures 2 (2024), Foundations of Pure Mathematics (2021), and Mathematical Workshop (2020).

SECONDARY SCHOOL LEVEL

Mathematics Tutor at the Brilliant Tutoring Programme Brilliant Club (online) Mar. 2021 - Jul. 2021

• I delivered bi-weekly online lessons to two groups of three KS3-level students from St. Mark's Church of England School on core topics in mathematics such as indices, surds, and ratio and angle problems.

PRIVATE TUTORING

Mathematics, Physics, and English Tutor Academia AGA (Alicante, Spain) November 2024 - present

• I deliver group and individual lessons, both in person and online, to a diverse group of 12 to 21 year old students, focusing mostly on teaching mathematics (high school and university level), as well as preparing students for particular exams, such as International Baccalaureate's Mathematics: Analysis and Interpretation (Standard Level) or Cambridge English: B2 First for Schools.

OUTREACH

EVENTS

Mathematical Modelling and Problem Solving Day (slides) University of Manchester, Manchester (UK) 23rd Jun. 2021 & 30th Jun. 2022

• Yearly one-day event aimed at Year 12 students for them to take part in real world problem solving projects lead by PhD students. I lead the cryptography project for the 2021 and 2022 events; this consisted in explaining some of the early history of cryptography, and then going through some basic modular arithmetic to use it in a particular instance of the Diffie-Hellman key exchange protocol.

Talks

Mathematics at University and Infinite Sets (slides) Trinity Church of England High School, Manchester (UK) 10th Mar. 2020

Matemáticas en la Universidad (Mathematics at University) IES Mediterrània, Benidorm (Spain)

11th Sep. 2019

EVENT ORGANISATION

Mathematics Research Students' Conference (co-organiser; ~ 70 attendees) University of Manchester

September 2022

• Funding obtained from the Manchester Institute for Mathematical Sciences.

British Postgraduate Model Theory Conference (co-organiser; ~ 50 attendees) University of Manchester

12th - 14th Jan. 2022

• Online conference. Funding obtained from the Manchester Institute for Mathematical Sciences and the London Mathematical Society.

Pure Postgraduate Seminar (co-organiser; ~ 20 attendees)

University of Manchester

Student Logic Seminar (organiser; ~ 10 attendees)

University of Manchester

Manchester MSc Pure Mathematics Seminar (organiser; ~ 10 attendees)

University of Manchester

Oct. 2021 - Jun. 2022

Oct. 2019 - Jun. 2020

University of Manchester

Grants and Prizes

MRSC 2nd prize for best talk

October 2023

Mathematics Research Students' Conference, University of Manchester

- Award: £50.
- Talk title: Transferring properties between mathematical structures via model theory.

MRSC 2nd prize for best poster

October 2021

Mathematics Research Students' Conference, University of Manchester

- Award: £25.
- Poster Title: Real closed rings: an overview.

President's Doctoral Scholar Award University of Manchester

2020 - 2024

• £1000 per year for living allowance.

Manchester Research Scholar Award University of Manchester

Sep. 2020 - Mar. 2024

• Covers PhD tuition fees and maintenance grant (\sim £15,285 per year).

High Standard of Attainment Departmental Award University of Manchester

July 2020

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• Award: £100.

LMS Summer School 2019

14th - 24th Jul. 2019

London Mathematical Society, Leeds

• A two-week course organized by the LMS to introduce modern mathematics to high-achieving UK undergraduates.

LMS Undergraduate Research Bursary 2019

Jun. 2019 - Jul. 2019

London Mathematical Society, University of Manchester

- Project title: Invariants of the simultaneous conjugacy problem for matrices over C (pdf).
- Project supervisor: Marcus Tressl.
- Bursary value £1,260 (match-founded together with the University of Manchester).
- Grant reference: URB 18-19-09.

LANGUAGES

Spanish (native speaker), English (IELTS certificate score: 7.5), Catalan (Proficient User C1), and Polish (basic user A2).