

PIERRE-ALAIN JACQMIN

PERSONAL DETAILS

Family Name: Jacqmin
First name: Pierre-Alain
Date of Birth: 11 April 1991
Citizenship: Belgian
Marital Status: Married, two children
Affiliation: Université catholique de Louvain
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RESEARCH INTERESTS

Category Theory, Categorical Algebra, Universal Algebra, Logic, Algebra, Theoretical Computer Science.

EDUCATION

- 2013–2016: Ph.D. in Sciences, Université catholique de Louvain, ‘Embedding theorems in non-abelian categorical algebra’. Supervisors: Prof. E.M. Vitale and Prof. Z. Janelidze.
- 2012–2013: Master in Mathematical Sciences, Université catholique de Louvain.
Final grade: La plus grande distinction.
Dissertation: ‘Classification of cat-groups’. Supervisor: Prof. E.M. Vitale.
- 2011–2012: Part III of the Mathematical Tripos, University of Cambridge, King’s College.
Final grade: Distinction.
Dissertation: ‘Homology in semi-abelian categories’. Supervisor: Dr. J. Goedecke.
- 2008–2011: Bachelor in Mathematical Sciences, Université catholique de Louvain.
Final grade: La plus grande distinction.
Dissertation: ‘Sous-groupes normaux de groupes de matrices’. Supervisor: Prof. P.-E. Caprace.
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RESEARCH EXPERIENCE

- 2019–present: FNRS Postdoctoral researcher at the Université catholique de Louvain (host: E.M. Vitale).
- 2017–2019: Postdoctoral researcher at the University of Ottawa (hosts: R. Blute, T. Giordano, P. Hofstra, P.-E. Parent, A. Savage and Ph. Scott).
- Sep.–Dec. 2014: Visit of Stellenbosch University for a collaboration with Z. Janelidze.
- 2013–2016: Ph.D. at the Université catholique de Louvain supervised by E.M. Vitale and Z. Janelidze.
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PUBLICATIONS

Peer-reviewed journal articles

- [with M. Hoefnagel and Z. Janelidze]: The matrix taxonomy of finitely complete categories, *Theory and Applications of Categories* **38 (19)** (2022), 737–790.

- A class of exactness properties characterized via left Kan extensions, *Journal of Pure and Applied Algebra* **226** (1) (2022), 106784.
- [with Z. Janelidze]: On linear exactness properties, *Journal of Algebra* **583** (2021), 38–88.
- [with Z. Janelidze]: On stability of exactness properties under the pro-completion, *Advances in Mathematics* **377** (2021), 107484.
- [with D. Bourn and M. Gran]: On the naturalness of Mal'tsev categories, in Joachim Lambek: The Interplay of Mathematics, Logic, and Linguistics (eds. C. Casadio and P.J. Scott) *Outstanding Contributions to Logic* **20** (2021), 59–104.
- [with J. Beauvais-Feisthauer, R. Blute, I. Dewan and B. Drummond]: Finiteness spaces, étale groupoids and their convolution algebras, *Semigroup Forum* **101** (2) (2020), 243–258.
- Embedding theorems for Janelidze's matrix conditions, *Journal of Pure and Applied Algebra* **224** (2) (2020), 469–506.
- Categories of weak fractions, *Theory and Applications of Categories* **34** (46) (2019), 1526–1551.
- Partial algebras and embedding theorems for (weakly) Mal'tsev categories and matrix conditions, *Cahiers de Topologie et Géométrie Différentielle Catégoriques* **60** (4) (2019), 365–403.
- [with S. Mantovani, G. Metere and E.M. Vitale]: Bipullbacks of fractions and the snail lemma, *Journal of Pure and Applied Algebra* **223** (12) (2019), 5147–5162.
- [with R. Blute, J.R.B. Cockett and P.J. Scott]: Finiteness spaces and generalized power series, *Electronic Notes in Theoretical Computer Science* **341** (2018), 5–22.
- [with S. Mantovani, G. Metere and E.M. Vitale]: On fibrations between internal groupoids and their normalizations, *Applied Categorical Structures* **26** (5) (2018), 1015–1039.
- An embedding theorem for regular Mal'tsev categories, *Journal of Pure and Applied Algebra* **222** (5) (2018), 1049–1068.
- [with D. Rodelo]: Stability properties characterising n -permutable categories, *Theory and Applications of Categories* **32** (45) (2017), 1563–1587.
- [with E.M. Vitale]: Bicategories of fractions for groupoids in monadic categories, *Tbilisi Mathematical Journal* **8** (1) (2015), 85–105.

Submitted for publication

- [with M. Hoefnagel]: Matrix taxonomy and Bourn localization, *submitted for publication in Applied Categorical Structures*.
- [with M. Hoefnagel]: When a matrix condition implies the Mal'tsev property, *submitted for publication in Cahiers de Topologie et Géométrie Différentielle Catégoriques*.
- [with M. Hoefnagel, Z. Janelidze and E. van der Walt]: On binary matrix properties, *submitted for publication in Quaestiones Mathematicae*.

In preparation

- On classes of morphisms behaving like surjections.
- [with V. Aravantinos-Sotiropoulos and M. Hoefnagel]: Some exactness properties stable under the exact completion of a regular category.

Other scientific publications

- [with M. Sebille]: EGMO 2017 à Zürich, *Losanges* **39** (2017), 54–59.
- [with M. Sebille]: European Girl's Mathematical Olympiad 2014 ou l'art de méjuger un questionnaire, *Losanges* **27** (2014), 60–64.
- [with M. Sebille]: European Girl's Mathematical Olympiad 2013, *Losanges* **21** (2013), 47–52.
- [with M. Sebille]: European Girl's Mathematical Olympiad 2012, *Losanges* **17** (2012), 50–55.

TALKS

- May 2022, Antwerp Algebra Colloquium, Antwerp, Belgium, *An introduction to Mal'tsev categories* (invited talk).
- April 2022, 5th Workshop on Categorical Algebra: Recent developments and future perspectives, Gargnano, Italy, *Pro-completion, exactness properties and their implications* (invited talk).
- April 2022, Junior Category Theory Seminar, Louvain-la-Neuve, Belgium, *The Orthogonal Subcategory Problem*.
- March 2022, Séminaire Sémantique de l'Institut de Recherche en Informatique Fondamentale, Paris, France, *Propriétés d'exactitude stables par pro-complétion* (invited talk).
- December 2021, Junior Category Theory Seminar, Louvain-la-Neuve, Belgium, *Relations and their matrix properties*.
- October 2021, Séminaire Itinérant de Catégories, Calais, France, *Propriétés d'exactitude et leur caractérisation variétale* (invited talk).
- August 2021, International Category Theory Conference (CT 20→21), Genoa, Italy, *On classes of morphisms behaving like surjections*.
- March 2021, Stellenbosch Seminar Series in Categorical Algebra, Stellenbosch, South Africa (online), *On classes of morphisms behaving like surjections*.
- March 2020, Junior Category Theory Seminar, Louvain-la-Neuve, Belgium, *An introduction to Fraissé limits*.
- January 2020, Departmental Colloquium, Stellenbosch, South Africa, *Generalized rings of power series and finiteness spaces* (invited talk).
- November 2019, Junior Category Theory Seminar, Louvain-la-Neuve, Belgium, *Classical embedding theorems*.
- June 2019, Ottawa-Carleton Logic Seminar, Ottawa, Canada, *Weak reflections, polyfunctors and the small object argument*.
- October 2018, Ottawa-Carleton Logic Seminar, Ottawa, Canada, *Embedding theorem for (weakly) Mal'tsev categories*.
- June 2018, 34th Conference on the Mathematical Foundations of Programming Semantics, Halifax, Canada, *Finiteness spaces and generalized power series*.
- May 2018, 4th Workshop on Categorical Algebra: Recent developments and future perspectives, Gargnano, Italy, *Internal fibrations and their normalizations* (invited talk).
- May 2018, UCL-ULB-VUB Category Theory Seminar, Louvain-la-Neuve, Belgium, *Finiteness spaces and generalized power series*.
- February 2018, Ottawa-Carleton Logic Seminar, Ottawa, Canada, *Stability properties characterising n -permutable categories*.
- February 2018, Ottawa-Carleton Logic Seminar, Ottawa, Canada, *Functorial exactness properties*.
- September 2017, Ottawa-Carleton Joint Algebra Seminar, Ottawa, Canada, *Where the snake is just a snail*.
- July 2017, International Category Theory Conference (CT 2017), Vancouver, Canada, *An embedding theorem for regular Mal'tsev categories*.
- May 2017, Category Theory Seminar, Cambridge, United Kingdom, *Embedding theorems for (regular) Mal'tsev categories* (invited talk).
- May 2016, 4th Workshop on Categorical Methods in Non-Abelian Algebra, Coimbra, Portugal, *An embedding theorem for regular Mal'tsev categories*.

- March 2016, UCL-ULB-VUB Category Theory Seminar, Brussels, Belgium, *An embedding theorem for regular Mal'tsev categories.*
 - September 2015, Workshop in Category Theory and Algebraic Topology, Louvain-la-Neuve, Belgium, *Bicategories of fractions for groupoids in monadic categories.*
 - January 2015, 97th Peripatetic Seminar on Sheaves and Logic, Louvain-la-Neuve, Belgium, *Exactness properties and cofiltered limit completion.*
 - November 2014, Brümmer 80 Seminar, Cape Town, South Africa, *Embedding theorem for regular subtractive categories.*
 - October 2014, 57th South African Mathematical Society annual congress, Johannesburg, South Africa, *Bicategories of fractions for groupoids in monadic categories.*
 - October 2014, Seminar of the Centre for Mathematical Structure, Stellenbosch, South Africa, *An introduction to bicategories.*
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TEACHING EXPERIENCE

- Spring 2022: Algèbre commutative (LMAT1331) at UCLouvain, Lecturer.
 - Fall 2018: Méthodes Mathématiques II (MAT 1702 C) at uOttawa, Instructor.
 - Winter 2018: Mathematical Methods II (MAT 1302 B) at uOttawa, Instructor.
 - Fall 2017: Mathematical Methods I (MAT 1300 D) at uOttawa, Instructor.
 - Spring 2017: Mathématiques générales 1 (LMAT 1111 G) at UCLouvain, Teaching Assistant.
 - Spring 2015: Mathématiques : algèbre et calcul matriciel (LINGE 1121) at UCLouvain, Teaching Assistant.
 - Autumn 2013: Mathématiques générales 1 (LMAT 1111 D) at UCLouvain, Teaching Assistant.
 - 2013–present: Teaching in the mathematical olympiad training sessions for high school Belgian students.
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PHD STUDENTS

- Nadja Egner (since 2021), co-supervised also by Marino Gran (UCLouvain).
 - Ineke van der Berg (since 2022), co-supervised also by Zurab Janelidze (University of Stellenbosch) and Alessandra Palmigiano (Vrije Universiteit Amsterdam).
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SERVICE

- Jury member for the PhD defenses of Idriss Tchoffo Nguefeu (2020, UCLouvain) and Vasileios Aravantinos-Sotiropoulos (2021, UCLouvain).
- Reviewer for the following international journals: ‘Journal of Pure and Applied Algebra’, ‘Theory and Applications of Categories’, ‘Applied Categorical Structures’, ‘Compositionality’ and ‘Annales Mathematicae Silesianae’.
- In 2020, co-organised the weekly Junior Category Theory Seminar in UCLouvain.
- Co-organised the summer school and workshop ‘Operads and higher structures in Algebraic Topology and Category Theory’ in Ottawa, July–August 2019.
- Co-organised the ‘UCLouvain Math PhD Seminar 2017’ in Leuven.
- Co-organised the ‘UCLouvain Math PhD Seminar 2016’ in Namur.
- 2020–2021: Leader of the senior Belgian team for the Olympiade Francophone de Mathématiques (online).

- 2012–2017: Deputy Leader of the Belgian team for the European Girls’ Mathematical Olympiad (Cambridge, Luxembourg, Antalya, Minsk, Busteni and Zurich).
- 2014–2016: Deputy Leader of the Belgian team for the Benelux Mathematical Olympiad (Brugge, Mersch and Soest).
- Coordinator for the Benelux Mathematical Olympiad in 2017 in Namur.
- Member of the ‘Société Belge des Professeurs de Mathématique d’expression française’ (SBPMef).
- 2013 and 2014: Animation of a stand at the ‘Printemps des Sciences’ at UCLouvain, for popularisation of Mathematics to 10–18 year old children.

AWARDS–GRANTS–FUNDING

- ‘Qualifié aux fonctions de Maître de Conférences’ (2021).
- FSR Funding from UCLouvain (49 000 €) in collaboration with M. Gran to support the PhD thesis of our joint student N. Egner (2020).
- Support from the National Scientific Fund of Belgium F.R.S.-FNRS to visit Stellenbosch University (South Africa) in 2020 (\approx 1 300 €).
- ‘Chargé de recherches’ grant from the National Scientific Fund of Belgium F.R.S.-FNRS, together with a support for operating costs of 15 000 € (2018).
- Support from the Fields Institute (Toronto) for the organisation the summer school and workshop ‘Operads and higher structures in Algebraic Topology and Category Theory’ in 2019 (15 000 \$).
- Renewal of doctoral fellowship from the National Scientific Fund of Belgium F.R.S.-FNRS, together with a support for operating costs of 5 000 € (2015).
- Support from the National Scientific Fund of Belgium F.R.S.-FNRS to visit Stellenbosch University (South Africa) for 3 months in 2014 (\approx 3 500 €).
- Doctoral fellowship from the National Scientific Fund of Belgium F.R.S.-FNRS, together with a support for operating costs of 5 000 € (2013).
- Second prize in the International Mathematical Competition for University Students 2011 (Bulgaria).
- Two bronze medals in the International Mathematical Olympiad 2007 (Vietnam) and 2008 (Spain).
- Two first, two second and two third prizes in the ‘Olympiade Mathématique Belge’ (2003–2008).

LANGUAGES

- French: Mother tongue
- English: Fluent
- Dutch: Beginner