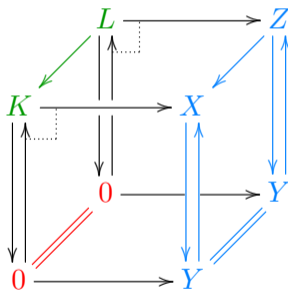
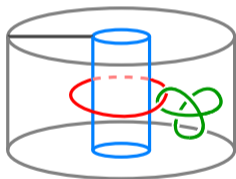


# Algebraic Topology and Category Theory

at IRMP, 2017–2022

Tim Van der Linden and Pedro Vaz



Advisory Scientific Committee — 26th of April 2024

1.

Who are we?

Marino



GRAN

Enrico



VITALE

Pedro



Vaz

Tim



VAN DER LINDEN

Pascal



LAMBRECHTS

Yves



FELIX



# Who are we?

2.

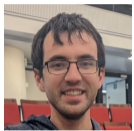


Florence



STERCK  
MCF invitée

Arnaud



DUVIEUSART  
Postdoc

Maxime



CULOT  
PhD

Bo Shan



DEVAL  
PhD

Julia



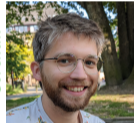
RAMOS GONZALEZ  
Postdoc

Lucy



GROSSMAN  
PhD

Corentin



VIENNE  
PhD

Nadja



EGNER  
PhD

Federico



CAMPANINI  
Postdoc

David



FORSMAN  
PhD

Geoffrey



JANSSENS  
Postdoc

Rodrigue



HAYA ENRIQUEZ  
PhD

Léo



SCHELSTRAETE  
PhD

Pierre-Alain



JACQUIN  
Postdoc



3.

## Research interests



### Category theory

- Homological algebra in non-abelian categories
- Categorical and universal algebra
- Homotopy limits in homological algebra
- Classification of extensions; obstruction theory via fibrations
- Non-abelian torsion theories



- ☞ Rational homotopy theory & and Goodwillie calculus
  - Configuration spaces
  - Spaces of embeddings
  - Non-simply connected spaces and LS-category

- ☞ Low-dim. top. & Categorification
  - Link homology (Khovanov)
  - Representation theory & applications to LD topology
    - quantum groups
    - quantum algebras (Hecke/cluster/skein)
    - analytic methods in RT



(*) Alan Cigoli (*) Jacques Darné Pierre-Alain Jacqmin Ülo Reimaa	— Category Theory —	Aline Michel (2023) Arnaud Duvieusart (2020) Cyrille Sandry Simeu (2021) Davide di Micco (2020) Fara Renaud (2021) Florence Sterck (2021) (*) Guillermo López-Caffagi (2022) Idriss Tchoffo Ngeufeu (2020) Vasileios Aravantinos-Sotiropoulos (2021) Xabier García-Martínez (2017) (*)
(*) Abel Lacabanne Cyrille Sandry Simeu Fara Renaud (*) Fathi Ben Aribi (*) Jieru Zhu Juliet Cooke	— Algebraic Topology —	Daniel Zimmer (→ PhD didactics) Elia Rizzo Grégoire Naisse (2019) Jean Mugniery Zagor Kitio



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## 5.

## *Regular seminars*



- *Algebraic Topology Seminar*
- *Quantum groups, Hopf algebras, and monoidal categories*  
— joint with ULB + VUB
- *Secret Seminar*  
on cluster algebras and topology



- *Category Theory Seminar*  
— joint with ULB + VUB
- *Junior Category Theory Seminar*



## 6.

*Conferences & workshops*

- *Séminaire Itinérant de Catégories*, ULB 2017 and UCLouvain 2019
- *5th Workshop on Categorical Methods in Non-Abelian Algebra*, LLN 2017
- *Peripatetic Seminar on Sheaves and Logic 102*, Santiago de Compostela 2018
- *4th Workshop on Categorical Algebra: Recent developments and future perspectives*, Gargnano 2018
- *Aspects of Higher Representation Theory: quantum groups and categorification*, Brussels 2019
- *Peripatetic Seminar on Sheaves and Logic 105*, Palermo 2019
- *Operads and higher structures in Algebraic Topology and Category Theory*, Ottawa 2019
- *Summer School in Algebra and Topology*, LLN 2019





Marino is a member of the **Category Theory Advisory Committee**, editor-in-chief of

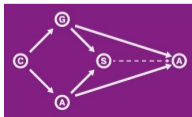
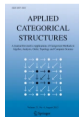
- **Cahiers de Topologie et Géométrie Différentielle Catégoriques**,

and a member of the editorial board of

- **Applied Categorical Structures**
- **Categories and General Algebraic Structures with Applications**
- **Journal of Homotopy and Related Structures**

Tim is a member of the editorial board of

- **Theory and Applications of Categories**
- **Advanced Studies: Euro-Tbilisi Mathematical Journal**





Pedro

- 2024 PHC Tournesol  
*Complex Reflection Groups and Categorical Representations*
- 2023 CDR-FNRS *Soergel Categories of Affine Type, Links in Handlebodies and Super Categories*
- 2018 MIS-FNRS *2-Verma modules and its ramifications*
- 2015 CR-FNRS *Higher Representation theory and topology*

Pedro + Pascal

- 2018 PHC Tournesol *Operads and quantum topology*

Yves

- 2020 Spanish Min. Research *Modern Homotopy Theory and Algebraic Structures: Applications and Interactions*

Marino + AT and CT groups

- 2018–2021 F.A.I. University of Ottawa

**F** THE FIELDS INSTITUTE

## Workshop on Operads and Higher Structures in Algebraic Topology and Category Theory

**JULY 29 - AUGUST 2, 2019** UNIVERSITY OF OTTAWA

The event focuses on operads and other higher structures. Although it will be oriented on Algebraic Topology and Category Theory, all communities are welcome.

The first three days (29-30-31 July) is devoted to a summer school taught by three lecturers. It will introduce the topics of the conference to any participants, including young or less experienced researchers.

A workshop is organized the next two days (1-2 August) with talks given by invited speakers.



**SUMMER SCHOOL SPEAKERS**

Manfred Hartl (Northeast Normal University - Université Polytechnique des Hauts de France)  
Pascal Lambrechts (Université catholique de Louvain)  
Mark Weber (Macquarie University)

**WORKSHOP SPEAKERS**

Murray Bremner (University of Saskatchewan)  
Urtil Buijs (Universidad de Málaga)  
Benoit Fresse (Université de Lille)  
Ibáñez García-Martínez (Universidad de Vigo)  
Simon Henry (Masaryk University)  
Olo Roosaa (University of Tartu)  
Jonathan Scott (Cleveland State University)  
Victor Turchin (Kansas State University)  
David White (Denison University)

**ORGANIZERS**

Pierre-Alain Jacqmin (University of Ottawa)  
Paul-Eugène Parent (University of Ottawa)

**SCIENTIFIC COMMITTEE**

Richard Blute (University of Ottawa)  
Pierre-Alain Jacqmin (University of Ottawa)  
Paul-Eugène Parent (University of Ottawa)  
Philip Scott (University of Ottawa)  
Tim Van der Linden (Université catholique de Louvain)

**REGISTRATION** To register please send an email to the organizers: [pjacqmin@uottawa.ca](mailto:pjacqmin@uottawa.ca) or [pparent@uottawa.ca](mailto:pparent@uottawa.ca)






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Marino

- Hoover Seedfund Project *Higher Categorical Structures* with J. Hopkins (2021–24)
- 2023 CDR FNRS *Galois theory and quasi-categories*



Yves: The *Ferran Sunyer i Balaguer* 2020 prize

Tim: *Prix du Concours annuel 2017 (Mathématiques)* of the *Académie royale de Belgique*

Tim + Xabier García: *Premio de Investigación E. Viéitez Cortizo 2019 (Mención Honorífica)*



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|---------------------------------|---------------------------------------|----------------------------------|
| 12 J. Pure Appl. Algebra        | 1 Ann. Math. Blaise Pascal            | 1 J. Interdiscip. Math.          |
| 9 Theory Appl. Categ.           | 1 Ann. Mat. Pura Appl. (4)            | 1 J. Knot Theory Ramifications   |
| 7 Appl. Categ. Structures       | 1 Ark. Mat.                           | 1 J. Lie Theory                  |
| 6 J. Algebra                    | 1 Bull. Belg. Math. Soc.              | 1 J. Topol.                      |
| 4 J. Algebra Appl.              | 1 Canad. J. Math.                     | 1 Log. Methods Comput. Sci.      |
| 3 Adv. Math.                    | 1 Canad. Math. Bull.                  | 1 Proc. London Math. Soc.        |
| 3 Homology Homotopy Appl.       | 1 Cah. Topol. Géom. Differ. Catég.    | 1 Math. Scand.                   |
| 3 Israel J. Math.               | 1 Comment. Math. Univ. Carolin.       | 1 Nieuw Arch. Wiskd. (5)         |
| 2 Algebra Universalis           | 1 C. R. Math. Acad. Sci. Paris        | 1 Osaka J. Math.                 |
| 2 Algebr. Geom. Topol.          | 1 Commun. Contemp. Math.              | 1 Proc. Edinb. Math. Soc. (2)    |
| 2 Ann. Inst. Fourier (Grenoble) | 1 Confluentes Math.                   | 1 Rend. Semin. Mat. Univ. Padova |
| 2 Math. Z.                      | 1 Electron. Notes Theor. Comput. Sci. | 1 Repères-IREM                   |
| 2 Pacific J. Math.              | 1 Forum Math.                         | 1 Selecta Math. (N.S.)           |
| 2 Proc. Amer. Math. Soc.        | 1 Fund. Math.                         | 1 Semigroup Forum                |
| 2 J. Homotopy Relat. Struct.    | 1 J. Comb. Algebra                    | 1 SIGMA                          |
| 2 Quantum Topol.                | 1 J. Reine Angew. Math.               | 1 Topology Appl.                 |

U. Buijs, Y. Félix, A. Murillo, D. Tanré, *Lie models in topology*, Birkhäuser, 2020.

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### General Mathematics



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**(Algebraic) Topology**





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**Other Fields**



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M. M. Clementino, A. Facchini, M. Gran, *New perspectives in algebra, topology and categories*, Springer, 2021.



And we're done...  
Thank you for your attention!