

# Curriculum Vitae

## Geoffrey JANSSENS

### PERSONAL DATA

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CITIZENSHIP: Belgian  
EMAIL: [geoffrey.janssens@uclouvain.be](mailto:geoffrey.janssens@uclouvain.be)  
MOTHER TONGUE: French, Dutch  
FLUENT: English, German

### EMPLOYMENT AND EDUCATION

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CURRENTLY Postdoctoral Researcher, Université Catholique de Louvain-La-Neuve  
Fellowship: Chargé de Recherche du Fond de la Recherche Scientifique (FNRS)  
Member of the research team of Prof. Dr. Pedro Vaz

10/2021- Senior Postdoctoral Research Fellow, VUB  
(on leave till 9/2024) Fellowship: Fonds voor Wetenschappelijk Onderzoek (FWO)  
Member of the research team of Prof. Dr. Kenny De Commer

3/2020 - 9/2020 Postdoctoral visiting researcher, Université de Paris  
& 3/2022 - 7-2022 Member of the research team 'Groupes, Représentations et Géométrie'  
working with Prof. Dr. Bernhard Keller.

6/2017-9/2021 Junior Postdoctoral Research Fellow, VUB  
Fellowship: Fonds voor Wetenschappelijk Onderzoek (FWO)

10/2014 - 5/2017 Ph.D. in Mathematics, Vrije Universiteit Brussel  
Title: Identities of Affine Algebras and their Asymptotic Behaviour  
Supervisor: Prof. Dr. Eric Jespers and Dr. Alexey Gordienko  
Grant: Fonds voor Wetenschappelijk Onderzoek (FWO)

10/2012 - 9/2014 Teaching assistant, Mathematics Department VUB

9/2010 - 6/2012 Master in Fundamental Mathematics, Vrije Universiteit Brussel  
Grade: Grootste Onderscheiding  
Thesis: "The Isomorphism problem for Integral Group Rings"  
Supervisor: Prof. Dr. Eric Jespers

### SCIENTIFIC AWARDS

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2016-3 KWG prize  
*The prize is yearly awarded at the Dutch National Mathematical Congress for mathematical merits during the PhD and ability to make subject accessible to non-specialists.*

2018-11 Reinhold Baer prize  
*The prize is annually granted jointly by the association AGTA and publisher Aracne for outstanding PhD thesis in group theory and its applications. Received a special mention.*

## PUBLICATIONS AND PREPRINTS

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### Publications

- (1) G. Janssens, *Primitive Central Idempotents of Rational Group Algebras*, J. Algebra Appl. 12 (2013), no. 1, 125–130
- (2) A. Gordienko, G. Janssens,  *$\mathbb{Z}S_n$ -modules and polynomial identities with integer coefficients*, Int. J. Algebra Comput. 23 (2013), no. 8, 1925–1943
- (3) E. Aljadeff, G. Janssens, Y. Karasik, *The Polynomial Part of the Codimension Growth of Affine PI algebras*, Adv. Math. 309 (2017), 487–511.
- (4) A. Gordienko, G. Janssens, E. Jespers, *Semigroup graded algebras and graded PI-exponent*, Israel J. Math. 220 (2017), no.1, 387–452
- (5) G. Janssens, E. Jespers, D. Temmerman, *Free products in the unit group of the integral group ring of a finite group*, Proc. Amer. Math. Soc. 145 (2017), no. 7, 2771–2783
- (6) G. Janssens, *A Glimpse into the Asymptotics of Polynomial identities*, Nieuw Arch. Wiskd. (5) 18 (2017), no.1, 60–64
- (7) F. Eisele, G. Janssens, T. Raedschelders, *A reduction theorem for  $\tau$ -rigid modules*, Math. Z. 290 (2018), 3–4, 1377–1413
- (8) G. Janssens, *Codimension Growth of Lie algebras with a generalized action*, Proc. Amer. Math. Soc. 150 (2022), no. 7, 2741–2754
- (9) A. Bächle, G. Janssens, E. Jespers, A. Kiefer, D. Temmerman, *A dichotomy for integral group rings via higher modular groups as amalgamated products*, J. Algebra 604 (2022), 185–223
- (10) A. Bächle, G. Janssens, E. Jespers, A. Kiefer, D. Temmerman, *Abelianization and fixed point properties of linear groups and units in integral group rings*, Math. Nachr. 296 (2023), no. 1, 8–56

### Preprints and work in final phase

- (11) F. Caenepeel, G. Janssens, *Gliders Representation Rings with a view on distinguishing groups*, submitted (2020), 41 pp, arXiv:1911.11733
- (12) G. Janssens, F. Jespers, O. Schnabel, *Units of twisted group rings and their correlations to classical group rings*, submitted (2023), 47 pp, arXiv:1811.12184
- (13) G. Janssens, L. Margolis, *On integral decomposition of unipotent elements in integral group rings*, submitted (2023), 44 pp, arXiv:2307.14820
- (14) G. Janssens, D. Temmerman, F. Thilmany, *Simultaneous ping-pong of finite subgroups of reductive groups*, available upon request (2023), 29 pp
- (15) G. Janssens, U. Jezernik, *Rigidity of groups and associated quotient varieties related via cohomology ring*, available upon request (2023)

### GAP-code

- (i) F. Eisele, G. Janssens, T. Raedschelders, GAP for tau-tilting modules : code written for our paper, <https://github.com/feisele/tau-tilting-article-code/blob/master/tautilting.g>

## INVITED TALKS

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### Invited talks at conferences and workshops

- "Cluster ensembles and the Fock-Goncharov conjectures", *Arbeitsgemeinschaft Cluster Algebras*, Oberwolfach, 13 October 2023
- "The representation theory bridge from the Bogomolov multiplier to class preservers", *Groups, Rings and the Yang-Baxter equation*, Blankenberghe, 20 June 2023
- "Filtrations of Group representations : a glider perspective", *Second Antipode Workshop*, ULB, Brussels, 13 September 2022
- "The Subgroup Congruence Problem and its role in group rings", *GTA: Gran Bilbao, conference*, Bilbao, Spain, 28 February 2019
- "The integral isomorphism problem, a helping hand from (geometric) group theory", *AGTA Workshop - Reinhold Baer Prize*, Napoli, Italy, 5 November 2018
- "A Glimpse into the asymptotics of Polynomial identities", *Conference Groups, Rings and the Yang-Baxter equation*, Spa, Belgium, 20 June 2017
- "Abstracte groepen, meer dan gewoon abstracte objecten", *Nationale Wiskunde Dagen*, Noordwijkerhout, Netherlands, 4 February 2017
- "Identities of Algebras and Groups and their Asymptotic behaviour", *BeNeLux Mathematical Congress*, University of Amsterdam, Netherlands, 23 March 2016

### Invited talks at seminars and summerschools

- "An abundance of free products in  $GL_n(D)$ ", *algebra seminar*, University of Ljubljana, 23 May 2023
- "The virtual structure problem for group rings: a helping hand by geometric group theory"  
*MSU-IIT Algebra Lecture Series*, Philippines, online, 15 March 2023
- "Comparing additive and monoidal categorification via Quantum Affine Algebras"  
*Seminar on quantum groups*, Université Catholique de Louvain, 19 October 2022
- "A polynomial identity perspective on the classification of finite dimensional algebras", *Séminaire Algèbre et Topologie*, Université de Strassbourg, 11 October 2022
- "Des matrices qui communiquaient dans 2 langues étonnamment différentes (une histoire selon J. Tits)"  
*BSSM - Brussels Summer School Of Mathematics*, ULB, Brussels, 2 September 2022
- "On the Virtual Structure Problem for group rings", *Group Theory Seminar*, ICMAT, Madrid, 24 February 2022
- "Amalgamated Decompositions of Higher Modular Groups and their Elementary Part", *Seminário de Álgebra*, University of Brasilia, online, 9 April 2021
- "A reduction theorem for  $\tau$ -rigid modules: string algebras ringing", *Séminaire d'algèbre*, Institut Henri Poincaré (IHP), Paris, 16 March 2020
- "From Laws to Polynomial Identities: rewrapping Lehmer conjecture", *The Junior Seminar in Pure Mathematics*, KU Leuven, 11 December 2019
- "The integral isomorphism problem, a helping hand from (geometric) group theory", *Algebra seminar UPV/EHU*, Bilbao, Spain, 17 April 2018
- "Polynomial identities through the eye of Kemer", *Algebra seminar Haifa university*, Israel, 23 November 2017

- "(integral) Isomorphism Problem, a (geometric) group theory point of view", *Algebra seminar Technion*, Haifa, Israel, 9 November 2017
- "A glimpse into the asymptotics of polynomial identities", *Antwerp algebra seminar*, University of Antwerp, Belgium, 28 April 2017
- "A glimpse into the asymptotics of polynomial identities", *Oberseminar Gruppen und Geometrie*, Bielefeld, Germany, 19 October 2016
- "Growth of Algebras and Groups", *Junior Seminar in Analytic, Geometric and Topological Group Theory*, Louvain-La-Neuve, Belgium, 29 January 2015
- "PI-exponent of algebras and some applications on distinguishing varieties of algebras", *Oberseminar algebra*, Stuttgart, Germany, 25 November 2014

## SUPERVISION

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### Supervision of Ph.D. students

- 2015 - 2019 Doryan Temmerman, *Fixed point properties for low rank linear groups over orders and applications to integral group rings*, co-supervisor: Eric Jespers  
Defended on 24th of May 2019

### Supervision of Bachelor thesis

- 2015 - 2016 Charlotte Verwimp, *Free groups and the Growth of Groups*  
 2015 - 2016 Maurits van Roozendaal, *The McKay Correspondence*  
 2019 - 2020 Maxime Wybouw,  *$S_n$  through the looking glass en  $GL_d$  als de Mad Hatter - Shur-Weyl dualiteit*  
 2019 - 2020 Julie Symons, *How abelian can a finite group be? : The Joseph Conjectures*  
 2020 - 2021 Robynn Corveleyn, *Lie methods in Group Theory : On Wilson and Zelmanov's GI-PI theorem*  
 2021 - 2022 Wannes Malfait, *Taking commuting probabilities to infinity and beyond*  
 2021 - 2022 Marthe Ballon, *Buchbergers algorithm and optimization with Machine Learning*  
 2021 - 2022 Andreas Lorrain, *Van topologie naar combinatoriek : een introductie tot simplicale verzamelingen*  
 2021 - 2022 Charlotte Roelants, *A trip to the tropics: solving Hilbert's 16th problem using Tropical geometry*

### Supervision of pedagogical projects

- 2013 - 2014 Ilse Spruyt, Onderwijsstage Analyse I  
 2016 - 2017 Estelle Osman, Onderwijsstage Groepentheorie

## FELLOWSHIPS

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- 2014-10 Aspirant Fellowship, Research Foundation Flanders (FWO)  
*Personal four year PhD research grant from the national science foundation (ranked 2nd)*
- 2018-10 Post-doctoral Fellowship, Research Foundation Flanders (FWO)  
*Personal three year post-doctoral grant (ranked 1st)*
- 2020-02 Grant of the FWO for a long research stay abroad  
*6732 euro for my long visit to Prof. B. Keller at Université de Paris*
- 2021-10 Senior Post-doctoral Fellowship, Research Foundation Flanders (FWO)  
*Personal three year post-doctoral grant*
- 2021-10 Chargé de Recherches, Fund for Scientific Research (F.R.S.-FNRS)  
*Personal three year post-doctoral grant*
- 2022-02 Grant of the FWO for a long research stay abroad  
*5148 euro for a long visit to Prof. B. Keller at Université Paris cité*

## RESEARCH VISITS AND STAYS

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- 2021-8 Oberwolfach, Germany, Research in Paris with Doryan Temmerman (two weeks)
- 2021-11 & 2022-2 ICMAT (Madrid), Spain, hosted by Leo Margolis (six weeks)  
& 2023-1
- 2021-6/7 Université de Paris (Diderot), France, hosted by Bernhard Keller (one month)
- 2018-4 & 2018-12 University of the Basque Country, Spain, hosted by Urban Jezernik (seven weeks)  
& 2019-3
- 2018-3 University of Glasgow, hosted by Theo Raedschelders (one week)
- 2017-10/11 Techion- Israel institute of Technology, hosted by Eli Aljadeff (two months)
- 2017-6 City Univeristy London, hosted by Florian Eisele (one week)
- 2016-10 University of Bielefeld, hosted by Ann Kiefer (one week)
- 2016-2 City Univeristy London, hosted by Florian Eisele (one week)
- 2015-2 University of Bonn, hosted by Theo Raedschelders (one week)
- 2014-11 University of Stuttgart, hosted by Leo Margolis (one week)

## PROFESSIONAL ACTIVITIES

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### Commissions

- 2023-2024 Assemblée de la Transition UCLouvain  
*group of 60 members from all structures of UCL selected to discuss the transition plan*
- 2023-2024 Tuchtcommissie  
*representant of all OAP of VUB inside the disciplinary committee*
- 2021-2023 Academische raad VUB  
*Representant of all OAP (=phd and post-docs) of the university inside the academic counsel*
- 2021-2023 Universiteitsraad VUB  
*Representant of the OAP of Faculty of Sciences inside the university counsel*
- 2021-2023 NSE raad  
*Representant of the OAP inside the counsel of the doctoral school*
- 2021-2023 BCB raad  
*Member of the council responsible for the university library*
- 2013-2017 Departementsraad  
*Representant of the teaching assistants inside VUB Math department counsel*
- 2015-2017 Faculteitsraad  
*Mathematics representant inside VUB Science and Bio-engineering faculty counsel*

## Conference and Colloquium Organisation

- 2nd June 2017 Fourth Young mathematician Colloquium (main organizer)  
*The YMC aimed at gathering together young researchers from Belgium and the North of France and from all fields of Mathematics.*
- 13 May 2016 Third Young mathematician Colloquium (co-organizer)
- 9-15 June 2019 Groups, Rings and associated structures (local organizer)
- 18-24 June 2017 Groups, Rings and the Yang-Baxter Equation (local organizer)

## Seminar (co)-Organisation

- Oct. 2022 – current Seminar of Algebraic Topology  
*co-organizer of the research seminar of the research team in UCLouvain*
- Nov. 2022 – Febr. 2023 Structure theory of Reductive groups and more  
*main organiser of a learning seminar on reductive groups. focus was on both structure theory and their representations*
- March – June 2021 Pursuing Stacks  
*main organiser of a group de travail on stacks following Jarod Alper's course.*
- 2016 – Dec 2019 ALGB research group seminar  
*main organiser of the weekly seminar of Algebra research group.*
- April-June 2015 Student seminar "From groups to fusion categories" (co-organizer)  
*reading seminar on fusion categories and isocategorical groups.*
- March-May 2014 TTC student seminar (co-organizer)  
*reading seminar on tilting and torsion Theory in representation theory.*
- Spring 2014 BRAGS (co-organizer)  
*reading seminar based on 'The Rising Sea' of Ravi Vakil.*

## Referee Work

Transactions of the AMS, Advances in Mathematics, Proceedings of the AMS, Proceedings of the Edinburgh Mathematical Society, Journal of Algebra, Advances in Group Theory and Applications, Beiträge zur Algebra und Geometrie, Journal of Algebra and its Applications, Bulletin of Iranian Mathematical Society, Comptes Rendus de l'Académie des Sciences

## OUTREACH

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### Broad public articles

- (i) G. Janssens, *A Glimpse into the Asymptotics behind Polynomial Identities in algebras*, Newsletter Belgian Mathematical Society 108 (2016), 7–9
- (ii) G. Janssens, *A Glimpse into the Asymptotics of Polynomial identities*, Nieuw Arch. Wiskd. (5) 18 (2017), no.1, 60–64

### Broad public talks

- (a) "Des matrices qui communiquaient dans 2 langues étonnamment différentes (une histoire selon J. Tits)"  
*BSSM - Brussels Summer School Of Mathematics, ULB, Brussels, 2 September 2022*
- (b) "Identities of Algebras and Groups and their Asymptotic behaviour",  
*BeNeLux Math. Congress, University of Amsterdam, Netherlands, 23 March, 2016*
- (c) "Abstracte groepen, meer dan gewoon abstracte objecten",  
*Nationale Wiskunde Dagen, Noordwijkerhout, Netherlands, 4 February 2017*

- (d) "How to apply successfully for an FWO post-doctoral Fellowship"  
*FWO grant info-session, Vrije Universiteit Brussel, 5 October 2018*

### **High school students**

- 2012–2019 Open House Day VUB and SID-in  
*Spokesperson for the mathematics programme of VUB at diverse events for high school students*

### **Museum Night Fever (MNF)**

- 2013–2017 Interactive historical and scientific activities during MNF  
*MNF is a yearly event where all Brussels musea are open in the evening with a special program. With the student group SWAMP we were present in, a.o., the BELvue museum and Museum for Natural sciences with corresponding historical interactive games. In 2014 we were 2nd at the public prize*

## **TEACHING EXPERIENCE**

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### **Lecturer for the following courses:**

- Fall 2019 - 2022 Ring- en Moduultheorie  
*Introduction to representation theory of finite groups and to ring theory for 2nd year bachelor in Mathematics.*

### **Teaching Assistant for the following courses:**

- Fall 2019 & 2021 Lineaire algebra: stelsels, matrices en afbeeldingen  
*Linear algebra for 1st year Bachelor in Mathematics and Physics*
- Fall 2012–2014 & Spring 2016–2019 Lineaire Algebra  
*Introduction to linear algebra, 1st year Bachelor in Informatics, Biology or Chemistry*
- Fall 2018 Inleiding Algebraïsche Meetkunde  
*Introduction to algebraic geometry following Andreas Gathmann's course, 3th year Bachelor in Mathematics*
- Spring 2016–2017 Galoistheorie  
*Galois theory for 3th Bachelor in Mathematics*
- Spring 2015–2017 Inleiding Groepen Theorie  
*Introduction to group theory, 1st year Bachelor in Mathematics*
- 2012–2016 Clinics Lineaire Algebra  
*Evening classes on Introduction to linear algebra, Schakel in Informatics*
- Spring 2013–2015 Wiskunde voor Computerwetenschappen  
*Wavelet and Fractal data compression, 2nd year Bachelor in Informatics*
- Spring 2013–2015 Clinics Wiskunde voor Computerwetenschappen  
*Evening classes on Wavelet and Fractal data compression, Schakel in Informatics*

- 2012–2014 Analyse: Afleiden, integreren en numerieke software  
*Introduction to Analysis, 1st year Bachelor in Mathematics and Physics*
- Spring 2013 Affiene en projectieve meetkunde  
*Introduction to affine and projective geometry, 2nd year Bachelor in Mathematics*
- Spring 2013 Aanvullingen Lineaire Algebra  
*Follow up on linear algebra, 1st year Bachelor in Mathematics*

## CONTRIBUTED TALKS

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### Talks given at international conferences:

- "On the number of  $n$ -term silting complexes",  
*ICRA (international conference on representations of algebras, Universidad de Buenos Aires, Argentina, 12 August 2022*
- "From torsion units to amalgamated products and back",  
*Advances in Group Theory and Applications, Universita del Salento, Lecce, Italy, 27 June 2019*
- "How can (modular) representation theorists help ring theory? ",  
*Groups, Rings and Associated Structures, Spa, Belgium, 10 June 2019*
- "A Reduction theorem for 2-term tilting complexes and iterated tilting mutation",  
*Aspects of Higher Representation Theory, Belgium, 23 January 2019*
- "A Reduction theorem of  $\tau$ -Rigid Modules",  
*International congress on representations of algebras (ICRA), Syracuse University, US, 15 August, 2016*
- "PI-exponent and Structure of Lie algebra with an Algebra acting",  
*Groups and Rings Theory and Application, Bulgarian Academy of Sciences, Sofia, 16 July, 2015*
- " $\mathbb{Z}S_n$ -modules and polynomial identities with integer coefficients",  
*Brock International Conference on Groups, Rings and Group Rings, Brock University, St.Catharines, Canada, 28 July 2014*
- "Primitive Central Idempotents of Rational Group Algebras",  
*Group, Rings, Lie and Hopf algebras.III, Memorial University of Newfoundland, Canada, 17 august 2012*

### Talks given at seminars, summerschools or workshops:

- "Nerves, infinity categories and the Boardman-Vogt construction",  
Learning seminar on Higher categories following Cisinski's book, 27 April 2022
- "On tau-tilting modules over generalized preprojective algebras following Fu-Geng",  
Working group on clusters, quivers and geometry, Paris, 8 April 2022
- "Which amalgamted products exist in  $GL_n(D)$ ?",  
Group Theory seminar, Madrid, 3 March 2022
- "A survey on word growth of groups with a view on dichotomies",  
Algebra seminar UPV/EHU, Bilbao, Spain, 12 March 2019
- "Proof of Carlson Conjecture, following P. Symonds",  
ArXiv seminar, VUB, Belgium, 7 December 2018



- "Minimal Model Program and Contraction algebras, following J. August", ArXiv seminar, VUB, Belgium, 4 May 2018
- "A surprise dichotomy for integral groups", ALGB seminar, VUB, Belgium, 16 November 2017
- "Examples of Koszul Algebras from combinatorics", BIREP summerschool, Bad Driburg, Germany, 10 August 2015
- "Isocategorical groups", Student seminar 'From groups to fusion categories', Brussels, 30 April 2015
- "Torsion Theory of finite dimensional algebras", TTC student seminar, Belgium, weekly April 2014
- "On schemes and nilpotents in affine schemes", BRAGS, brussels, Belgium, November 2013
- "Almost split sequences of Artinian Algebras", Representation Theory Seminar, VUB, Belgium, October 2013