

# Arne Van Antwerpen

Rue Cesar Franck 46  
1050 Ixelles, Belgium

Phone: +32479666776  
email: [arne.vanantwerpen@telenet.be](mailto:arne.vanantwerpen@telenet.be)  
URL: <https://vanantwerpen.github.io/>  
Born: July 07, 1993—Edegem, Belgium  
Nationality: Belgian

## Current position

*Post-doctoral assistant*, Department of Mathematics: Algebra and Geometry, UGent, Gent

## Research Interests

I enjoy applying the interaction of group and ring theory with combinatorial problems. My current research focuses on set-theoretic solutions of the Yang-Baxter equation and relating their properties to groups, rings and a recently introduced notion called skew braces. Vice versa, I employ set-theoretic solutions of the Yang-Baxter equation to construct exciting groups and rings, containing polycyclic groups, RAAG's and Jacobson radical rings.

## Positions held

2023-current	Post-doctoral assistant, Universiteit Gent, Gent
2020-2023	FWO post doctoral fellow (junior), Vrije Universiteit Brussel, Brussel
2016-2020	FWO phd fellow, Vrije Universiteit Brussel, Brussel

## Education

2020	PhD in Science (Mathematics), Vrije Universiteit Brussel
2016	MSc in Mathematics, Universiteit Antwerpen
2014	BSc in Mathematics, Universiteit Antwerpen

## Grants and awards

### PERSONAL GRANTS

2025-2028	Grant - FWO senior post-doctoral fellow - Fonds Wetenschappelijk Onderzoek Vlaanderen, Belgium ( salary + 4000 euros yearly travel grant )
2020-2023	Grant - FWO junior post-doctoral fellow - Fonds Wetenschappelijk Onderzoek Vlaanderen, Belgium ( salary + 4000 euros yearly travel grant )
2016-2020	Grant - FWO Aspirant - Fonds Wetenschappelijk Onderzoek Vlaanderen, Belgium ( salary + 3720 euros yearly travel grant )

#### CONFERENCE FUNDING

- 2022 Grant - Conference funding FWO for conference “Groups, rings and Yang-Baxter equation” (joint w. I. Colazzo and L. Vendramin) - 5000 euro
- 2022 Grant - Conference funding Compositio Mathematica for conference “Groups, rings and Yang-Baxter equation” (joint w. I. Colazzo and L. Vendramin) - 5000 euro

#### PHD GRANTS

- 2021-2025 Grant for S.Trappeniers - FWO Aspirant - Fonds Wetenschappelijk Onderzoek Vlaanderen, Belgium ( salary + 3720 euros yearly travel grant)
- 2023-2027 Grant for S.Properzi - FWO Aspirant - Fonds Wetenschappelijk onderzoek Vlaanderen, Belgium ( salary + 3720 euros yearly travel grant).

## Publications & talks

My 5 most important publications are highlighted by  $\star$ .

#### JOURNAL ARTICLES

- 2023 1. $\star$  Colazzo Ilaria, Jespers Eric, Kubat Lukasz, Van Antwerpen Arne, Verwimp Charlotte (2023), “Finite idempotent set-theoretic solutions of the Yang-Baxter equation”, *International Mathematics Research Notices*, doi: 10.1093/imrn/rnad183
- 2023 2. $\star$  Jespers Eric, Van Antwerpen Arne, Vendramin Leandro (2023), “Nilpotency of skew braces and multipermutation solutions of the Yang-Baxter equation”, *Communications in Contemporary Mathematics* 25 (09), 2250064.
- 2023 3. Cedó Ferran, Jespers Eric, Kubat Łukasz, Van Antwerpen Arne, Verwimp Charlotte (2020), “On various types of nilpotency of the structure monoid and group of a set-theoretic solution of the Yang-Baxter equation”, *Journal of Pure and Applied Algebra* 227 (2): 107194
- 2022 4. Colazzo Ilaria, Jespers Eric, Van Antwerpen Arne, Verwimp Charlotte (2021), “Left non-degenerate set-theoretic solutions of the Yang-Baxter Equation and semitrusses”, *Journal of Algebra* 610: 409-462
- 2020 5. $\star$  Jespers Eric, Kubat Lukasz, Van Antwerpen Arne, Vendramin Leandro (2021), “Radical and weight of skew braces and their applications to structure groups of solutions of the Yang-Baxter equation”, *Advances in Mathematics* 385: 107767
- 2020 6. Jespers Eric, Kubat Lukasz, Van Antwerpen Arne (2020), “Corrigendum et addendum to The structure monoid and algebra of a non-degenerate set-theoretic solution of the Yang-Baxter equation”, *Transactions of the American Mathematical Society* 373 (6): 4517-4521
- 2019 7. Colazzo Ilaria, Van Antwerpen Arne (2019), “The algebraic structure of left semi-trusses”, *Journal of Pure and Applied Algebra* 225 (2): 106467
- 2019 8. $\star$  Jespers Eric, Kubat Lukasz, Van Antwerpen Arne, Vendramin Leandro (2019), “Factorizations of skew braces”, *Mathematische Annalen* 375 (3-4): 1649-1663
- 2019 9. $\star$  Jespers Eric, Kubat Lukasz, Van Antwerpen Arne (2019), “The structure monoid and algebra of a non-degenerate set-theoretic solution of the Yang-Baxter equation”, *Transactions of the American Mathematical Society* 372 (10): 7191-7223
- 2019 10. Jespers Eric, Van Antwerpen Arne (2019), “Left semi-braces and solutions of the Yang-Baxter equation”, *Forum Mathematicum* 31 (1): 241-263
- 2018 11. Van Antwerpen Arne (2018), “Coleman Automorphisms of finite groups and their minimal normal subgroups”, *Journal of Pure and Applied Algebra* 222 (11): 3379-3394

#### PRE-PRINT

- 2023 Colazzo Ilaria, Jespers Eric, Kubat Łukasz, Van Antwerpen Arne, “Simple solutions of the Yang-Baxter equation”, ArXiv:2312.09687.
- 2023 Colazzo Ilaria, Jespers Eric, Kubat Łukasz, Van Antwerpen Arne, “Structure algebras of finite set-theoretic solutions of the Yang-Baxter equation”, ArXiv:2305.06023.
- 2023 Properzi Silvia, Van Antwerpen Arne, “A common divisor graph for skew braces”, ArXiv:2306.12415.

#### SELECTION OF TALKS

- 2023 Centrally nilpotent skew braces, Groups, rings and the Yang-Baxter equation, Blankenberge, Belgium
- 2023 The structure monoid and algebra of a left non-degenerate solution of the Yang-Baxter equation, Algebra seminar, Exeter, UK
- 2023 Nilpotency of skew braces: an overview, Oberwolfach mini-workshop: skew braces and the Yang-Baxter equation, Oberwolfach, Germany
- 2022 The structure algebra of set-theoretic solutions to the Yang-Baxter equation, Groups and Algebras in Bicocca 2022, Milan, Italy
- 2022 Skew braces, the Yang-Baxter equation and non-associative algebras, Workshop on non-associative algebras 2022, Covilha, Portugal
- 2022 Skew braces and the Yang-Baxter equation, Algebra, Geometry and Physics seminar, joint MPIM and HU Berlin, Berlin, Germany
- 2022 Central nilpotency of skew braces, Algebra Seminar Edinburgh University, Edinburgh, UK
- 2019 Factorizations of skew left braces, Oberwolfach mini-workshop: Algebraic tools to solve YBE, Oberwolfach, Germany
- 2018 Left semi-braces and solutions of the Yang-Baxter equation, Noncommutative and Non-associative structures, braces and applications, Malta
- 2017 Coleman automorphisms of finite groups and their minimal normal subgroups, AGTA: Advances in Group Theory and Applications, Lecce, Italy

#### UPCOMING TALKS

- 04/2024 Invited speaker, Skew braces, Braids and the Yang-Baxter equation, Banff international research station, Canada
- 06/2024 Invited speaker, Yang-Baxter algebras, conference at Heriot-Watt, Edinburgh, UK

### Evaluator selection committee

- 2023 For PhD-mandate (6 years) at VUB
- 2020 For professor position “Algebra: groups, rings or the Yang-Baxter equation” at VUB
- 2019 For professor position “Discrete techniques in data science” at VUB

### Referee for international journals

Algebras and Representation Theory  
Bulletin of the London Mathematical Society  
Canadian Mathematical Bulletin  
Communications in Algebra  
International Mathematics Research Notices  
Journal of Algebra

Journal of Algebra and its Applications  
Journal of Combinatorial theory, series A  
Journal of London Mathematical Society  
Journal of Pure and Applied Algebra  
Proceedings of the Edinburgh Mathematical Society  
Proceedings of the Edinburgh Royal Society  
Publicacions Matemàtiques

## Evaluator PhD committee

2022 Charlotte Verwimp, Set-theoretic solutions of the Yang-Baxter equation and associated algebraic structures, VUB

## Teaching

### LECTURES

2023-current Linear Algebra and Geometry I (Ba 1 Mathematics and Physics, UGent)  
2023-current Algebra II: Fields and Galois theory (Ba 3 Mathematics, UGent)  
2020-2023 Introduction to Group Theory (Ba 1 Mathematics, VUB)

### TUTORIAL SESSIONS

2023 Introduction to GAP at CIMPA crossroads of geometry, representation theory and higher structures  
2022-2023 Basic skills in Mathematics (Ba 1 of all Sciences, VUB)  
2022-2023 Mathematical Statistics (Ba 3 Mathematics, VUB)  
2017-2021 Ring and Module Theory (Ba 2 Mathematics, VUB)  
2017-2020 Probability Theory (Ba 2 Mathematics, VUB)  
2016-2023 Linear Algebra (Ba 1 Biology, VUB)  
2016-2017 Discrete Mathematics (Ba 1 Mathematics, VUB)  
2016-2017 Calculus (Ba 1 Biology, VUB)

## Mentoring

### BACHELOR

2024 Z. Van Eetvelde - Skew braces of prime power order  
2021 B. D'Hauwer - Unique product groups and the unit conjecture  
2021 S. Croux - Embedding semigroups in groups  
2020 S. Frycia - To be nil or not to be nil: the extraordinary counterexample of A. Smoktunowicz  
2017 (joint with E. Jespers) Jente Bosmans - Quandles and their automorphisms

### MASTER

2023-2024 M. Moreel - Links between set-theoretic solutions of the Yang-Baxter equation and algebraic structures (for the course "Literature study" at UGent) S. Trappeniers - Skew braces and the Yang-Baxter equation: an exposition on structure theorems  
2017-2018 (joint with E. Jespers) C. Verwimp - Braces and the Yang-Baxter equation

## PHD

2021-current (joint with L. Vendramin) S. Trappeniers - The combinatorics of set-theoretic solutions to the Yang-Baxter equation and related algebraic structures - FWO Aspirant (2021-2025)

## Administrative tasks

### AT VRIJE UNIVERSITEIT BRUSSEL

2017-2019, 2020-2023 Representative in department council  
2017-2023 Representative in education council for mathematics (secretary: 2019-2023)  
2019-2023 Representative in faculty education council  
2020-2023 Representative in faculty council  
2021-2023 Representative in faculty board  
2020-2023 Representative in education quality council

### AT NATUUR EN WETENSCHAP VZW (YOUTH ORGANIZATION POPULARIZING SCIENCE)

2014-current Member of the Board  
2018-current Secretary of the Board, responsible for the administrative personnel

## Research stays

2024 Warsaw, Poland, Visiting J. Okninski between 7/04 and 13/04  
2023 St Andrews, UK, Visiting O. Konovalov between 15/05 and 20/05  
2023 Exeter, UK, Visiting I. Colazzo and N. Byott between 10/04 and 15/04  
2022 Edinburgh, UK, Visiting A. Smoktunowicz between 15th of November and 22nd of November  
2022 Berlin, Germany, Visiting P. Tamaroff between 7th of November and 12th of November  
2022 Warsaw, Poland, Visiting L. Kubat between 04/04 and 14/04  
2019 Buenos Aires, Argentina, visiting L. Vendramin between 23rd of September and 8th of October  
2019 Shanghai, China, visiting L. Vendramin, between 5th April and 17th April  
2019 Lecce, Italy, visiting F. Catino, I. Colazzo and P. Stefanelli between 4th of February and 1st of March

## Organized conferences

2023 local organizer: Doctor honoris causa seminar for Prof. Efim Zelmanov, VUB  
2023 main organizer: Groups, rings and the Yang-Baxter equation, Blankenberge, Belgium  
2019 local organizer: Groups, rings and associated structures, Spa, Belgium  
2017 local organizer: Groups, rings and the Yang-Baxter equation, Spa, Belgium

## Language proficiency

Dutch, native speaker  
English, fluent (C1 certificate)  
French, intermediate  
Italian, intermediate