

NICHOLAS WILLIAMS

<https://nchlswllms.github.io> ♦ nicholas.williams@lancaster.ac.uk

EDUCATION

Doctorate in Mathematics

University of Cologne
Started at University of Leicester
Supervisor: Sibylle Schroll
Summa cum laude

September 2018 – May 2022

April 2021 – May 2022

September 2018 – April 2021

Graduate Diploma in Quantitative Economics

Birkbeck, University of London
Distinction

October 2017 – June 2018

MMathPhil in Mathematics & Philosophy

Worcester College, Oxford
Double First Class Honours

October 2012 – June 2016

EMPLOYMENT

Postdoctoral Research Associate

Lancaster University
With David Pauksztello

September 2022 – March 2025

JSPS Short Term Postdoctoral Research Fellow

University of Tokyo
With Osamu Iyama

May 2022 – August 2022

Graduate Teaching Assistant

King's College London

September 2021 – December 2021

Guest Teacher

London School of Economics

September 2021 – December 2021

Feedback Session Leader

University of Leicester

January 2019 – December 2020

JOURNAL PUBLICATIONS

- | | |
|---|------------------|
| 7. A survey of congruences and quotients of partially ordered sets
<i>EMS Surveys in Mathematical Sciences</i> | <i>To appear</i> |
| 6. The two higher Stasheff–Tamari orders are equal
<i>Journal of the European Mathematical Society</i> | <i>To appear</i> |
| 5. Stability spaces of string and band modules
With Sibylle Schroll, Aran Tattar, Hipolito Treffinger, and Yadira Valdivieso
<i>Journal of Pure and Applied Algebra</i> , Volume 228, no. 4, 107503 | <i>2024</i> |
| 4. Quiver combinatorics and triangulations of cyclic polytopes
<i>Algebraic Combinatorics</i> , Volume 6, no. 3, pp. 639–60 | <i>2023</i> |
| 3. The first higher Stasheff–Tamari orders are quotients of the higher Bruhat orders
<i>Electronic Journal of Combinatorics</i> , Volume 30, no. 1, P1.29 | <i>2023</i> |
| 2. New interpretations of the higher Stasheff–Tamari orders
<i>Advances in Mathematics</i> , Volume 407, 108552 | <i>2022</i> |

1. The combinatorics of tensor products of higher Auslander algebras of type A 2021
 With Jordan McMahon
Glasgow Mathematical Journal, 63(3), pp. 526–546

CONFERENCE PROCEEDINGS

4. The higher Stasheff–Tamari orders in representation theory To appear
Proceedings of the 2020 International Conference on Representations of Algebras
3. Studying triangulations of even-dimensional cyclic polytopes via directed graphs 2023
Proceedings of the 35th International Conference on Formal Power Series and Algebraic Combinatorics, Séminaire Lotharingien de Combinatoire 89B, Art. 4
2. Triangulations of cyclic polytopes and the higher Auslander algebras of type A 2022
Various issues on representation theory and related topics
RIMS Kōkyūroku No.2234
1. The first higher Stasheff–Tamari orders are quotients of the higher Bruhat orders 2021
Proceedings of the 33rd International Conference on Formal Power Series and Algebraic Combinatorics, Séminaire Lotharingien de Combinatoire 85B, Art. 6

OTHER PUBLICATIONS

2. Microthesis: Triangulations of cyclic polytopes in representation theory 2022
London Mathematical Society Newsletter, No. 501, 33-34
1. Higher-dimensional combinatorics in representation theory 2022
 Doctoral thesis, University of Cologne

PREPRINTS

3. A geometric perspective on the τ -cluster morphism category 2023
 With Sibylle Schroll, Aran Tattar, and Hipolito Treffinger
[arXiv:2302.12217](https://arxiv.org/abs/2302.12217)
2. A structural view of maximal green sequences 2023
 With Mikhail Gorsky
[arXiv:2301.08681](https://arxiv.org/abs/2301.08681)
1. Triangulations of prisms and preprojective algebras of type A 2022
 With Osamu Iyama
[arXiv:2208.12957](https://arxiv.org/abs/2208.12957)

PRIZES AND SCHOLARSHIPS

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|--|------|
| Gibbs prize for Mathematics & Philosophy
University of Oxford
For top performance in Mathematics papers | 2016 |
| Gibbs prize for Mathematics & Philosophy
University of Oxford
For top performance in Mathematics papers | 2015 |
| Academic scholarship
Worcester College, Oxford | 2013 |
| Honorary scholarship
Westminster School | 2007 |

INVITED CONFERENCE TALKS (IN PERSON)

- Triangulations of cyclic polytopes through the lens of reconfiguration** *August 2023*
Minisymposium on Combinatorial Reconfiguration
International Congress on Industrial and Applied Mathematics
Waseda University, Tokyo
- A structural view of maximal green sequences** *June 2023*
Cluster structures in the North
University of Central Lancashire
- A structural approach to maximal green sequences** *September 2022*
Silting theory, algebras and representations
Charles University, Prague

INVITED CONFERENCE TALKS (VIRTUAL)

- An algebraic interpretation of the higher Stasheff–Tamari orders** *November 2020*
International Conference on Representations of Algebras
Selected to give talk by scientific committee based on research snapshot

CONTRIBUTED CONFERENCE TALKS (IN PERSON)

- Triangulations of prisms and preprojective algebras of type A** *July 2023*
Combinatorial representation theory in Leeds
University of Leeds
- A structural view of maximal green sequences** *April 2023*
Maurice Auslander Distinguished Lectures and International Conference
- Cyclic polytopes and representation theory** *December 2022*
Representation theory of algebras session
Canadian Mathematical Society Winter Meeting, Toronto
- Algebraic interpretation of the higher Stasheff–Tamari orders** *July 2022*
Various issues on representation theory and related topics
Research Institute for Mathematical Sciences, Kyoto University
- Higher analogues of Grassmannian clusters** *April 2019*
Maurice Auslander Distinguished Lectures and International Conference
- Higher analogues of Grassmannian clusters** *April 2019*
New Connections and Directions in Representation Theory
University of Leeds
- Higher analogues of Grassmannian clusters** *April 2019*
Tropical Geometry meets Representation Theory
University of Leicester

CONTRIBUTED CONFERENCE TALKS (VIRTUAL)

- The first higher Stasheff–Tamari orders are quotients of the higher Bruhat orders** *January 2022*
Formal Power Series and Algebraic Combinatorics
Bar-Ilan University

SEMINAR TALKS (IN PERSON)

Combinatorics of KP solitons

August 2023

Exact Asymptotics Theoretical Sciences Visiting Program
Okinawa Institute of Science and Technology

A structural view of maximal green sequences

February 2023

Algebra group seminar
University of Cologne

The higher Stasheff–Tamari orders on triangulations of cyclic polytopes

November 2022

Séminaire du LaCIM
Université du Québec à Montréal

Cyclic polytopes and representation theory

November 2022

Geometry and mathematical physics seminar
University of Birmingham

Cyclic polytopes and representation theory

October 2022

Pure mathematics seminar
Lancaster University

Mutation in higher cluster categories

October 2022

Seminar@Aarhus
Aarhus University

Equivalence of maximal green sequences

April 2022

Working seminar in algebra and geometry
University of Cologne

Equivalence of maximal green sequences

February 2022

Paris algebra seminar
Institut de Mathématiques de Jussieu-Paris Rive Gauche

An algebraic interpretation of the higher Stasheff–Tamari orders

November 2019

Pure mathematics seminar
University of East Anglia

Higher analogues of Grassmannian clusters

April 2019

Algebra and number theory seminar
University of Graz

SEMINAR TALKS (VIRTUAL)

Cyclic polytopes and higher Auslander–Reiten theory III

July 2022

Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University

Cyclic polytopes and higher Auslander–Reiten theory II

June 2022

Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University

Mutating cluster-tilting objects in $(d+2)$ -angulated cluster categories

June 2022

FD seminar

Cyclic polytopes and higher Auslander–Reiten theory I

June 2022

Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University

An algebraic interpretation of the higher Stasheff–Tamari orders Aachen–Bochum–Cologne Darstellungstheorie Seminar RWTH Aachen University, Ruhr-University Bochum, and University of Cologne	<i>January 2022</i>
Cyclic polytopes and higher Auslander–Reiten theory Tokyo–Nagoya algebra seminar University of Tokyo and Nagoya University	<i>December 2021</i>
The two higher Stasheff–Tamari orders are equal Working seminar in algebra and geometry University of Cologne	<i>May 2021</i>
The higher Stasheff–Tamari orders in representation theory Paris algebra seminar Institut de Mathématiques de Jussieu-Paris Rive Gauche	<i>April 2021</i>
New interpretations of the higher Stasheff–Tamari orders Diskrete Mathematik / Geometrie Forschungsseminar TU Berlin	<i>March 2021</i>

POSTERS

An algebraic interpretation of the higher Stasheff–Tamari orders <i>Young Researchers in Mathematics</i> Online Winner of 1 st prize in poster competition	<i>June 2021</i>
An algebraic interpretation of the higher Stasheff–Tamari orders <i>Advances in Representation Theory of Algebras</i> Online	<i>May 2021</i>
New interpretations of the higher Stasheff–Tamari orders <i>Combinatorial algebra meets algebraic combinatorics</i> Université du Québec à Montréal Online	<i>January 2021</i>
An algebraic interpretation of the higher Stasheff–Tamari orders <i>International Conference on Representations of Algebras</i> “Research snapshot” Online	<i>November 2020</i>
New interpretations of the higher Stasheff–Tamari orders <i>Virtual Heidelberg Laureate Forum</i> Online	<i>September 2020</i>
Representation theory and Grassmannians <i>STEM for Britain</i> Poster competition at UK Parliament	<i>March 2019</i>

GRANTS AND AWARDS

Japan Society for the Promotion of Science Short Term Postdoctoral Research Fellowship JPY 5,384,000 12 months awarded but 3 months taken	<i>December 2021</i>
London Mathematical Society Scheme 8 Postgraduate research conference grants <i>Categorifications in Representation Theory</i> conference organised with Aran Tattar GBP 2,500	<i>April 2020</i>

ORGANISATION

Köln Algebra and Representation Theory seminar

April 2021 – May 2022

Co-organised with Daniel Schaefer

University of Cologne

Online

Categorifications in Representation Theory conference

September 2020

Co-organised with Aran Tattar

Online

Mathematics PhD seminar

September 2019 – August 2020

University of Leicester

Representation theory and mirror symmetry conference

May 2019

Local organising committee

University of Leicester

RESEARCH STAYS

Okinawa Institute of Science and Technology

August – October 2023

Exact Asymptotics: From Fluid Dynamics to Quantum Geometry

Theoretical Sciences Visiting Program

Invited participant

2 months

Max Planck Institute for Mathematics, Bonn

February 2023

Visiting: Guillaume Laplante-Anfossi

1 week

Université du Québec à Montréal

November 2022

Visiting: Hugh Thomas

2 weeks

University of Aarhus

October 2022

Visiting: Raphael Bennett-Tennenhaus and Amit Shah

1 week

University of Cologne

April 2021

Visiting: Sibylle Schroll and Aran Tattar

1 week

University of Cambridge

December 2021

Isaac Newton Institute for Mathematical Sciences

Cluster algebras and representation theory programme

Invited participant

1 week

University of Graz

April 2019

Visiting: Jordan McMahon

Host: Karin Baur

1 week

REFEREEING

Communications in Algebra, Discrete Mathematics, Electronic Research Archive, Journal of Algebra, Journal of Algebraic Combinatorics

REVIEWING

AMS MathSciNet
3 reviews written

October 2022 – present

zbMATH
10 reviews written

September 2020 – present

TEACHING

Real analysis
Class teacher (online)
King's College London

September 2021 – December 2021

MA107: Quantitative methods
Class teacher
London School of Economics

September 2021 – December 2021

Calculus & analysis
Class teacher (online)
University of Leicester

October 2020 – December 2020

Second-year algebra
Class teacher
University of Leicester

January 2020 – April 2020

Calculus & analysis
Class teacher
University of Leicester

October 2019 – April 2020

Elements of number theory
Class teacher
University of Leicester

October 2019 – December 2019

Calculus & analysis
Class teacher
University of Leicester

January 2019 – March 2019

COMMITTEE ROLES

Mathematics & Philosophy Representative
Joint Consultative Committee with Undergraduates
University of Oxford

2015 – 2016

Undergraduate Representative
Joint Committee for Mathematics and Philosophy
University of Oxford

2015 – 2016

Undergraduate Representative
Mathematics Department Art Committee
University of Oxford

2015 – 2016

OUTREACH

University of Leicester Representative
Research in the UK afternoon
University of Cambridge

November 2018, 2019, 2020

Student Helper
Oxford and Cambridge Student Conferences

March 2013, 2014, 2015

OTHER

London Mathematical Society

June 2019 – present

Associate member

3 reports on conferences written for the LMS newsletter

Programming Python, Sage, Maple, node.js, Haskell
 Git
 L^AT_EX

Languages

	(CEFR levels)
English	Native
French	B1
German	B1
Japanese	B1