

NICHOLAS WILLIAMS

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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

4. Quiver combinatorics and triangulations of cyclic polytopes *2023*
Algebraic Combinatorics, Volume 6, no. 3, pp. 639–60.
3. The first higher Stasheff–Tamari orders are quotients of the higher Bruhat orders *2023*
Electronic Journal of Combinatorics, Volume 30, no. 1, P1.29.
2. New interpretations of the higher Stasheff–Tamari orders *2022*
Advances in Mathematics, Volume 407, 108552.
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

6. A survey of congruences and quotients of partially ordered sets 2023
[arXiv:2303.03765](https://arxiv.org/abs/2303.03765)
5. 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)
4. A structural view of maximal green sequences 2023
 (With Mikhail Gorsky)
[arXiv:2301.08681](https://arxiv.org/abs/2301.08681)
3. Stability spaces of string and band modules 2022
 (With Sibylle Schroll, Aran Tattar, Hipolito Treffinger, and Yadira Valdivieso)
[arXiv:2208.15000](https://arxiv.org/abs/2208.15000)
2. Triangulations of prisms and preprojective algebras of type A 2022
 (With Osamu Iyama)
[arXiv:2208.12957](https://arxiv.org/abs/2208.12957)
1. The two higher Stasheff–Tamari orders are equal 2021
[arXiv:2106.01050](https://arxiv.org/abs/2106.01050)

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)

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)

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)

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*January 2022*

Aachen–Bochum–Cologne Darstellungstheorie Seminar

RWTH Aachen University, Ruhr-University Bochum, and University of Cologne

Cyclic polytopes and higher Auslander–Reiten theory*December 2021*

Tokyo–Nagoya algebra seminar

University of Tokyo and Nagoya University

The two higher Stasheff–Tamari orders are equal*May 2021*

Working seminar in algebra and geometry

University of Cologne

The higher Stasheff–Tamari orders in representation theory*April 2021*

Paris algebra seminar

Institut de Mathématiques de Jussieu-Paris Rive Gauche

New interpretations of the higher Stasheff–Tamari orders*March 2021*

Diskrete Mathematik / Geometrie Forschungsseminar

TU Berlin

POSTERS

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

GRANTS AND AWARDS

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

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

Max Planck Institute for Mathematics, Bonn Visiting: Guillaume Laplante-Anfossi 1 week	<i>February 2023</i>
Université du Québec à Montréal Visiting: Hugh Thomas 2 weeks	<i>November 2022</i>
University of Aarhus Visiting: Raphael Bennett-Tennenhaus and Amit Shah 1 week	<i>October 2022</i>
University of Cologne Visiting: Sibylle Schroll and Aran Tattar 1 week	<i>April 2021</i>
University of Cambridge Isaac Newton Institute for Mathematical Sciences Cluster algebras and representation theory programme Invited participant 1 week	<i>December 2021</i>
University of Graz Visiting: Jordan McMahon Host: Karin Baur 1 week	<i>April 2019</i>

REFEREEING

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

REVIEWING

AMS MathSciNet 3 reviews written	<i>October 2022 – present</i>
zbMATH 9 reviews written	<i>September 2020 – present</i>

TEACHING

Real analysis Class teacher (online) King's College London	<i>September 2021 – December 2021</i>
MA107: Quantitative methods Class teacher London School of Economics	<i>September 2021 – December 2021</i>
Calculus & analysis Class teacher (online) University of Leicester	<i>October 2020 – December 2020</i>
Second-year algebra Class teacher University of Leicester	<i>January 2020 – April 2020</i>

Calculus & analysis*October 2019 – April 2020*

Class teacher

University of Leicester

Elements of number theory*October 2019 – December 2019*

Class teacher

University of Leicester

Calculus & analysis*January 2019 – March 2019*

Class teacher

University of Leicester

COMMITTEE ROLES

Mathematics & Philosophy Representative

2015 – 2016

Joint Consultative Committee with Undergraduates

University of Oxford

Undergraduate Representative

2015 – 2016

Joint Committee for Mathematics and Philosophy

University of Oxford

Undergraduate Representative

2015 – 2016

Mathematics Department Art Committee

University of Oxford

OUTREACH

University of Leicester Representative

*November 2018, 2019, 2020**Research in the UK afternoon*

University of Cambridge

Student Helper

*March 2013, 2014, 2015**Oxford and Cambridge Student Conferences***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

German

B1

French

B1

Japanese

A2