

NICHOLAS WILLIAMS

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EDUCATION

Doctorate in Mathematics

University of Cologne

Started at University of Leicester

Supervisor: Sibylle Schroll

Thesis title: *Higher-dimensional combinatorics in representation theory*

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

PUBLICATIONS

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

2. The higher Stasheff–Tamari orders in representation theory *To appear*
Proceedings of the 2020 International Conference on Representations of Algebras
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, 12.

PREPRINTS

5. Stability spaces of string and band modules 2022
(With Sibylle Schroll, Aran Tattar, Hipolito Treffinger, and Yadira Valdivieso)
arXiv:2208.15000
4. Triangulations of prisms and preprojective algebras of type A 2022
(With Osamu Iyama)
arXiv:2208.12957
3. Quiver combinatorics for higher-dimensional triangulations 2021
arXiv:2112.09189
2. The two higher Stasheff–Tamari orders are equal 2021
arXiv:2106.01050
1. The first higher Stasheff–Tamari orders are quotients of the higher Bruhat orders 2020
arXiv:2012.10371

PRIZES AND SCHOLARSHIPS

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

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
Via BigBlueButton

CONTRIBUTED CONFERENCE TALKS (IN PERSON)

- Algebraic interpretation of the higher Stasheff–Tamari orders** July 2022
Representation theory and various issues on related topics
Research Institute for Mathematical Sciences, Kyoto University
- Nice triangulations of cyclic polytopes** June 2019
London Mathematical Society Graduate Student Meeting
- Higher analogues of Grassmannian clusters** April 2019
Maurice Auslander Distinguished Lectures and International Conference

Higher analogues of Grassmannian clusters
New Connections and Directions in Representation Theory
University of Leeds

April 2019

Higher analogues of Grassmannian clusters
Tropical Geometry meets Representation Theory
University of Leicester

April 2019

CONTRIBUTED CONFERENCE TALKS (VIRTUAL)

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

January 2022

The higher Stasheff–Tamari orders on triangulations of cyclic polytopes
London Mathematical Society Graduate Student Meeting

June 2021

Vertex figures of cubillages of cyclic zonotopes
London Mathematical Society Graduate Student Meeting

November 2020

SEMINAR TALKS (IN PERSON)

Equivalence of maximal green sequences
Paris algebra seminar
Institut de Mathématiques de Jussieu-Paris Rive Gauche

February 2022

An algebraic interpretation of the higher Stasheff–Tamari orders
Pure mathematics seminar
University of East Anglia

November 2019

Higher analogues of Grassmannian clusters
Algebra and number theory seminar
University of Graz

April 2019

SEMINAR TALKS (VIRTUAL)

Cyclic polytopes and higher Auslander–Reiten theory III
Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University

July 2022

Cyclic polytopes and higher Auslander–Reiten theory II
Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University

June 2022

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

June 2022

Cyclic polytopes and higher Auslander–Reiten theory I
Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University

June 2022

An algebraic interpretation of the higher Stasheff–Tamari orders
Aachen–Bochum–Cologne Darstellungstheorie Seminar
RWTH Aachen University, Ruhr-University Bochum, and University of Cologne

January 2022

Cyclic polytopes and higher Auslander–Reiten theory
Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University

December 2021

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>
The Tamari lattice in representation theory Junior Algebra Colloquium University of Bristol	<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

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>
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ORGANISATION

Köln Algebra and Representation Theory seminar Co-organiser University of Cologne Online	<i>April 2021 – May 2022</i>
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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

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

REVIEWING

AMS MathSciNet

October 2022 – present

zbMATH

September 2020 – present

5 reviews written

REFEREEING

Journal of Algebraic Combinatorics

TEACHING

Real analysis*September 2021 – December 2021*

Class teacher (online)

King's College London

MA107: Quantitative methods*September 2021 – December 2021*

Class teacher

London School of Economics

Calculus & analysis*October 2020 – December 2020*

Class teacher (online)

University of Leicester

Second-year algebra*January 2020 – April 2020*

Class teacher

University of Leicester

Calculus & analysis*October 2019 – April 2020*

Class teacher

University of Leicester

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**

Small Grants Committee

The Leathersellers' Company

September 2022 – present

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

Associate member

3 reports on conferences written for the LMS newsletter

*June 2019 – present***Programming**

Python, Sage, Maple, node.js, Haskell

Git

L^AT_EX**Languages**

(CEFR levels)

English Native

German B1

French B1

Japanese A2

Spanish A1