

NICHOLAS WILLIAMS

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EDUCATION

Doctorate in Mathematics

University of Cologne

(University of Leicester)

Supervisor: Sibylle Schroll

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

Summa cum laude

September 2018 – May 2022

April 2021 – June 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

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 *To appear*
Advances in Mathematics
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

3. Quiver combinatorics for higher-dimensional triangulations *2021*
[arXiv:2112.09189](https://arxiv.org/abs/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 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

An algebraic interpretation of the higher Stasheff–Tamari orders <i>International Conference on Representations of Algebras</i> Selected to give talk by scientific committee based on research snapshot Via BigBlueButton	<i>November 2020</i>
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CONTRIBUTED CONFERENCE TALKS

The first higher Stasheff–Tamari orders are quotients of the higher Bruhat orders <i>Formal Power Series and Algebraic Combinatorics</i> Bar-Ilan University Via Zoom	<i>January 2022</i>
The higher Stasheff–Tamari orders on triangulations of cyclic polytopes <i>London Mathematical Society Graduate Student Meeting</i> Via Zoom	<i>June 2021</i>
Vertex figures of cubillages of cyclic zonotopes <i>London Mathematical Society Graduate Student Meeting</i> Via Zoom	<i>November 2020</i>
Nice triangulations of cyclic polytopes <i>London Mathematical Society Graduate Student Meeting</i>	<i>June 2019</i>
Higher analogues of Grassmannian clusters <i>Maurice Auslander Distinguished Lectures and International Conference</i>	<i>April 2019</i>
Higher analogues of Grassmannian clusters <i>New Connections and Directions in Representation Theory</i> University of Leeds	<i>April 2019</i>
Higher analogues of Grassmannian clusters <i>Tropical Geometry meets Representation Theory</i> University of Leicester	<i>April 2019</i>

SEMINAR TALKS

- Mutating cluster-tilting objects in $(d+2)$ -angulated cluster categories** *June 2022*
FD seminar
Via BigBlueButton
- Cyclic polytopes and higher Auslander–Reiten theory I** *June 2022*
Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University
Via Zoom
- Equivalence of maximal green sequences** *April 2022*
Working seminar in algebra and geometry
University of Cologne
In person
- Equivalence of maximal green sequences** *February 2022*
Paris algebra seminar
Institut de Mathématiques de Jussieu-Paris Rive Gauche
In person
- 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
Via Zoom
- Cyclic polytopes and higher Auslander–Reiten theory** *December 2021*
Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University
Via Zoom
- The two higher Stasheff–Tamari orders are equal** *May 2021*
Working seminar in algebra and geometry
University of Cologne
Via Zoom
- The higher Stasheff–Tamari orders in representation theory** *April 2021*
Paris algebra seminar
Institut de Mathématiques de Jussieu-Paris Rive Gauche
Via Zoom
- New interpretations of the higher Stasheff–Tamari orders** *March 2021*
Diskrete Mathematik / Geometrie Forschungsseminar
TU Berlin
Via Zoom
- The Tamari lattice in representation theory** *March 2021*
Junior Algebra Colloquium
University of Bristol
Via Zoom
- KP solitons** *October 2020*
PhD seminar
University of Leicester
Via Microsoft Teams
- KP solitons and the higher Stasheff–Tamari orders II** *October 2020*
Working seminar in algebra and geometry
University of Leicester
Via Zoom

KP solitons and the higher Stasheff–Tamari orders I*September 2020*

Working seminar in algebra and geometry

University of Leicester

Via Zoom

Triangulations of odd-dimensional cyclic polytopes*June 2020*

PhD seminar

University of Leicester

Via Blackboard Collaborate

Fukaya categories and higher Auslander algebras of type A*April 2020*

Working seminar in algebra and geometry

University of Leicester

Via Zoom

Cluster categories and crossing conditions*February 2020*

Working seminar in algebra and geometry

University of Leicester

An algebraic interpretation of the higher Stasheff–Tamari orders*November 2019*

Pure mathematics seminar

University of East Anglia

An algebraic interpretation of the higher Stasheff–Tamari orders*November 2019*

Working seminar in algebra and geometry

University of Leicester

Nice triangulations of cyclic polytopes*October 2019*

PhD seminar

University of Leicester

Higher analogues of Grassmannian clusters*April 2019*

Algebra and number theory seminar

University of Graz

Alternating strand diagrams, plabic graphs, and Grassmannians*January 2019*

PhD seminar

University of Leicester

Grassmannians*October 2018*

Working seminar in algebra and geometry

University of Leicester

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 <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 – present</i>
Categorifications in Representation Theory conference Co-organised with Aran Tattar Online	<i>September 2020</i>
Mathematics PhD seminar University of Leicester	<i>September 2019 – August 2020</i>
Representation theory and mirror symmetry conference Local organising committee University of Leicester	<i>May 2019</i>

RESEARCH STAYS

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>

REVIEWING

zbMATH 4 reviews written	<i>September 2020 – present</i>
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REFEREEING

Journal of Algebraic Combinatorics

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
 \LaTeX

Languages

	(CEFR levels)
English	Native
German	B1
French	B1
Japanese	A1
Spanish	A1