

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

Cyclic polytopes and higher Auslander–Reiten theory III

July 2022

Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University
Via Zoom

Cyclic polytopes and higher Auslander–Reiten theory II

June 2022

Tokyo–Nagoya algebra seminar
University of Tokyo and Nagoya University
Via Zoom

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 PhD seminar University of Leicester Via Microsoft Teams	<i>October 2020</i>
KP solitons and the higher Stasheff–Tamari orders II Working seminar in algebra and geometry University of Leicester Via Zoom	<i>October 2020</i>
KP solitons and the higher Stasheff–Tamari orders I Working seminar in algebra and geometry University of Leicester Via Zoom	<i>September 2020</i>
Triangulations of odd-dimensional cyclic polytopes PhD seminar University of Leicester Via Blackboard Collaborate	<i>June 2020</i>
Fukaya categories and higher Auslander algebras of type A Working seminar in algebra and geometry University of Leicester Via Zoom	<i>April 2020</i>
Cluster categories and crossing conditions Working seminar in algebra and geometry University of Leicester	<i>February 2020</i>
An algebraic interpretation of the higher Stasheff–Tamari orders Pure mathematics seminar University of East Anglia	<i>November 2019</i>
An algebraic interpretation of the higher Stasheff–Tamari orders Working seminar in algebra and geometry University of Leicester	<i>November 2019</i>
Nice triangulations of cyclic polytopes PhD seminar University of Leicester	<i>October 2019</i>
Higher analogues of Grassmannian clusters Algebra and number theory seminar University of Graz	<i>April 2019</i>
Alternating strand diagrams, plabic graphs, and Grassmannians PhD seminar University of Leicester	<i>January 2019</i>
Grassmannians Working seminar in algebra and geometry University of Leicester	<i>October 2018</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>
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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

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 – present*

Co-organiser

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

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
Visiting: Jordan McMahon
Host: Karin Baur
1 week

April 2019

REVIEWING

zbMATH
4 reviews written

September 2020 – present

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
Associate member
3 reports on conferences written for the LMS newsletter

June 2019 – present

Programming Python, Sage, Maple, node.js, Haskell
 Git
 \LaTeX

Languages

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