

# NICHOLAS WILLIAMS

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## EDUCATION

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### PhD in Mathematics

University of Cologne

University of Leicester

Supervisor: Sibylle Schroll

*April 2021 – June 2022 (expected)*

*September 2018 – September 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

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### University of Tokyo

JSPS London Short Term Predoctoral Research Fellow

Host: Osamu Iyama

One year

*Currently unable to take up due to COVID-19 travel restrictions*

### King's College London

Graduate Teaching Assistant

*September 2021 – December 2021*

### London School of Economics

Guest Teacher

*September 2021 – December 2021*

### University of Leicester

Feedback session leader

*January 2019 – December 2020*

## PUBLICATIONS

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The higher Stasheff–Tamari orders in representation theory

(Extended abstract)

*Proceedings of the 2020 International Conference on Representations of Algebras*

*To appear*

The first higher Stasheff–Tamari orders are quotients of the higher Bruhat orders

(Extended abstract)

*Proceedings of the 33rd International Conference on Formal Power Series and Algebraic Combinatorics, Séminaire Lotharingien de Combinatoire 85B, Art. 6, 12.*

*2021*

The combinatorics of tensor products of higher Auslander algebras of type  $A$

(With Jordan McMahon.)

*Glasgow Mathematical Journal*, 63(3), pp. 526–546.

*2021*

## PREPRINTS

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- Quiver combinatorics for higher-dimensional triangulations  
`arXiv:2112.09189` *December 2021*
- The two higher Stasheff–Tamari orders are equal  
`arXiv:2106.01050` *June 2021*
- The first higher Stasheff–Tamari orders are quotients of the higher Bruhat orders  
`arXiv:2012.10371` *December 2020*
- New interpretations of the higher Stasheff–Tamari orders  
`arXiv:2007.12664` *July 2020*

## PRIZES AND SCHOLARSHIPS

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- 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 TALKS

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- 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 TALKS

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- The first higher Stasheff–Tamari orders are quotients of the higher Bruhat orders** *January 2022*  
*Formal Power Series and Algebraic Combinatorics*  
Bar-Ilan University  
Via Zoom
- The higher Stasheff–Tamari orders on triangulations of cyclic polytopes** *June 2021*  
*London Mathematical Society Graduate Student Meeting*  
Via Zoom
- Vertex figures of cubillages of cyclic zonotopes** *November 2020*  
*London Mathematical Society Graduate Student Meeting*  
Via Zoom
- Nice triangulations of cyclic polytopes** *June 2019*  
*London Mathematical Society Graduate Student Meeting*

<b>Higher analogues of Grassmannian clusters</b> <i>Maurice Auslander Distinguished Lectures and International Conference</i>	<i>April 2019</i>
<b>Higher analogues of Grassmannian clusters</b> <i>New Connections and Directions in Representation Theory</i> University of Leeds	<i>April 2019</i>
<b>Higher analogues of Grassmannian clusters</b> <i>Tropical Geometry meets Representation Theory</i> University of Leicester	<i>April 2019</i>

## SEMINAR TALKS

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<b>An algebraic interpretation of the higher Stasheff–Tamari orders</b> Aachen–Bochum–Cologne Darstellungstheorie Seminar RWTH Aachen University, Ruhr-University Bochum, and University of Cologne Via Zoom	<i>January 2022</i>
<b>Cyclic polytopes and higher Auslander–Reiten theory</b> Tokyo–Nagoya algebra seminar University of Tokyo and Nagoya University Via Zoom	<i>December 2021</i>
<b>The two higher Stasheff–Tamari orders are equal</b> Working seminar in algebra and geometry University of Cologne Via Zoom	<i>May 2021</i>
<b>The higher Stasheff–Tamari orders in representation theory</b> Paris algebra seminar Institut de Mathématiques de Jussieu-Paris Rive Gauche Via Zoom	<i>April 2021</i>
<b>New interpretations of the higher Stasheff–Tamari orders</b> Diskrete Mathematik / Geometrie Forschungsseminar TU Berlin Via Zoom	<i>March 2021</i>
<b>The Tamari lattice in representation theory</b> Junior Algebra Colloquium University of Bristol Via Zoom	<i>March 2021</i>
<b>KP solitons</b> PhD seminar University of Leicester Via Microsoft Teams	<i>October 2020</i>
<b>KP solitons and the higher Stasheff–Tamari orders II</b> Working seminar in algebra and geometry University of Leicester Via Zoom	<i>October 2020</i>

**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**

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**An algebraic interpretation of the higher Stasheff–Tamari orders***June 2021**Young Researchers in Mathematics*

Online

Winner of 1<sup>st</sup> 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

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**GRANTS**

London Mathematical Society Scheme 8

*April 2020*

Postgraduate research conference grants

*Categorifications in Representation Theory* conference organised with Aran Tattar

GBP 2,500

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**ORGANISATION****Köln Algebra and Representation Theory seminar***April 2021 – present*

Co-organiser

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

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**RESEARCH STAYS**

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

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zbMATH

*September 2020 – present*

## REFEREEING

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Journal of Algebraic Combinatorics

## TEACHING

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### **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

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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

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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

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London Mathematical Society  
Associate member

*June 2019 – present*

**Programming**      Python, Sage, Maple, node.js, Haskell  
                              Git  
                               $\text{\LaTeX}$

### Languages

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

## OTHER EMPLOYMENT

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**Enders Analysis**  
Research analyst, Telecoms

*November 2016 – August 2018*