NICHOLAS WILLIAMS

https://nchlswllms.github.io ⬦ nicholas.williams@lancaster.ac.uk

EDUCATION

Doctorate in Mathematics	*September 2018 – May 2022*
University of Cologne	*April 2021 – May 2022*
Started at University of Leicester	*September 2018 – April 2021*
Supervisor: Sibylle Schroll	
Summa cum laude	

Graduate Diploma in Quantitative Economics	*October 2017 – June 2018*
Birkbeck, University of London	
Distinction	

MMathPhil in Mathematics & Philosophy	*October 2012 – June 2016*
Worcester College, Oxford	
Double First Class Honours	

EMPLOYMENT

Postdoctoral Research Associate	*September 2022 – March 2025*
Lancaster University	
With David Pauksztello	

JSPS Short Term Postdoctoral Research Fellow	*May 2022 – August 2022*
University of Tokyo	
With Osamu Iyama	

Graduate Teaching Assistant	*September 2021 – December 2021*
King's College London	

Guest Teacher	*September 2021 – December 2021*
London School of Economics	

Feedback Session Leader	*January 2019 – December 2020*
University of Leicester	

JOURNAL PUBLICATIONS

8. Triangulations of prisms and preprojective algebras of type A *To appear*
   With Osamu Iyama
   International Mathematics Research Notices

7. A survey of congruences and quotients of partially ordered sets   *To appear*
   EMS Surveys in Mathematical Sciences

6. The two higher Stasheff–Tamari orders are equal   *To appear*
   Journal of the European Mathematical Society

5. Stability spaces of string and band modules   *2024*
   With Sibylle Schroll, Aran Tattar, Hipolito Treffinger, and Yadira Valdivieso
   Journal of Pure and Applied Algebra, Volume 228, no. 4, 107503

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

PEER-REVIEWED CONFERENCE PROCEEDINGS

3. The higher Stasheff–Tamari orders in representation theory — 2023
Representations of Algebras and Related Structures

2. 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

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 CONFERENCE PROCEEDINGS

1. 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

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

4. Donaldson–Thomas invariants for the Bridgeland–Smith correspondence — 2024
With Omar Kidwai
`arXiv:2401.10093`

3. Steenrod operations via higher Bruhat orders — 2023
With Guillaume Laplante-Anfossi
`arXiv:2309.16481`

2. A geometric perspective on the τ-cluster morphism category — 2023
With Sibylle Schroll, Aran Tattar, and Hipolito Treffinger
`arXiv:2302.12217`

1. A structural view of maximal green sequences — 2023
With Mikhail Gorsky
`arXiv:2301.08681`

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)

Triangulations of cyclic polytopes through the lens of reconfiguration   *August 2023*
Minisymposium on Combinatorial Reconfiguration
International Congress on Industrial and Applied Mathematics
Waseda University, Tokyo

A structural view of maximal green sequences   *June 2023*
Cluster structures in the North
University of Central Lancashire

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)

Donaldson–Thomas invariants for the Bridgeland–Smith correspondence   *January 2024*
Cluster Algebras and Its Applications
Mathematisches Forschungsinstitut Oberwolfach

Triangulations of prisms and preprojective algebras of type A   *July 2023*
Combinatorial representation theory in Leeds
University of Leeds

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)

Donaldson–Thomas invariants for the Bridgeland–Smith correspondence — *October 2023*
Sheffield Geometry and Physics seminar
University of Sheffield

Donaldson–Thomas invariants for the Bridgeland–Smith correspondence — *October 2023*
EGRET seminar
University of Edinburgh

Donaldson–Thomas theory of quivers with potential — *September 2023*
Exact Asymptotics Theoretical Sciences Visiting Program
Okinawa Institute of Science and Technology

Higher-dimensional cluster combinatorics and representation theory — *August 2023*
OIST Representation Theory Seminar
Okinawa Institute of Science and Technology

Combinatorics of KP solitons — *August 2023*
Exact Asymptotics Theoretical Sciences Visiting Program
Okinawa Institute of Science and Technology

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

Studying triangulations of even-dimensional cyclic polytopes *July 2023*
via directed graphs
Formal Power Series and Algebraic Combinatorics
University of California, Davis

An algebraic interpretation of the higher Stasheff–Tamari orders *June 2021*
Young Researchers in Mathematics
Online
Winner of 1$^{\text{st}}$ 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

London Mathematical Society Scheme 1 *October 2023*
Conference grants
Silting, simple-minded, and stability
Co-organised with Raquel Coelho Simões and David Pauksztello
GBP 4,000

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
Co-organised with Aran Tattar
GBP 2,500

ORGANISATION

Silting, simple-mindedness, and stability *July 2024*
Co-organising with Raquel Coelho Simões and David Pauksztello
Ambleside Campus, University of Cumbria

Köln Algebra and Representation Theory seminar *April 2021 – May 2022*
Co-organised with Daniel Schaefer
University of Cologne
Online

Categorifications in Representation Theory *September 2020*
Co-organised with Aran Tattar
Online

Mathematics PhD seminar *September 2019 – August 2020*
University of Leicester

Interactions between Representation Theory *May 2019*
and Homological Mirror Symmetry
Local organising committee
University of Leicester

RESEARCH STAYS

University of Copenhagen   *January 2024*
Visiting: Guillaume Laplante-Anfossi
Host: Nathalie Wahl
1 week

Okinawa Institute of Science and Technology   *August – October 2023*
Exact Asymptotics: From Fluid Dynamics to Quantum Geometry
Theoretical Sciences Visiting Program
Invited participant
2 months

Université du Québec à Montréal   *November 2022*
Visiting: Hugh Thomas
2 weeks

University of Aarhus   *October 2022*
Visiting: Raphael Bennett-Tennenhaus and Amit Shah
1 week

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

REFEREEING

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

REVIEWING

AMS MathSciNet   *October 2022 – present*
6 reviews written

zbMATH   *September 2020 – present*
11 reviews written

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   *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
                       LaTeX

Languages
                                (CEFR levels)
                       English   Native
                       French   B1
                       German   B1
                       Japanese   B1