

# Zee Fryer

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## CONTACT INFORMATION

*Preferred name:* Zee  
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## RESEARCH INTERESTS

**Quantum algebras**, in particular algebras of quantum matrices and their semi-classical limits,  $H$ -prime stratification, prime and primitive spectra.

**Totally nonnegative matrices**, including the combinatorics of total positivity in the real Grassmannian, Cauchon-Le diagrams, applications to noncommutative algebra, applications to quantum field theory.

**Related topics in algebra and combinatorics**, e.g. cluster algebra structures on the coordinate ring of the (quantum) Grassmannian, combinatorics of flag varieties.

## ACADEMIC POSITIONS

**University of California Santa Barbara**, 2016 - 2019  
Visiting Assistant Professor  
**University of Leeds**, 2014 - 2016  
EPSRC Doctoral Fellow

## EDUCATION

**University of Manchester**, 2010 - 2014  
PhD in Mathematics  
Thesis: *The  $q$ -Division Ring, Quantum Matrices, and Semi-classical Limits*  
Advisor: Professor Toby Stafford  
**University of Nottingham**, 2005 - 2009  
MMath in Pure Mathematics, 1st Class Hons.  
Masters Dissertation: *Involutions on Composition Algebras*  
Advisor: Dr Susanne Pumplün

## TEACHING

**Calculus II:** Integration and applications (Fall 2017, Fall 2018, Spring 2019).  
**Calculus III:** Multivariable calculus (Spring 2017).  
**Differential Equations** (Winter 2017).  
**Transition to Higher Mathematics:** Introduction to pure mathematics and proofs (Fall 2016, Winter 2018, Fall 2018, Winter 2019).  
**Abstract Linear Algebra** (Spring 2018).  
**Abstract Algebra:** Fields and Galois Theory (Spring 2018).  
**Groups and Symmetry:** graduate level group theory (Fall 2015).

## PAPERS

*All papers published under the name Siân Fryer.*

1. S. Agarwala, **S. Fryer**. An algorithm to construct the Le diagram associated to a Grassmann necklace. *Glasg. Math. J.* (2019) 1-7
2. **S. Fryer**, T. Kanstrup, E. Kirkman, A. Shepler, S. Witherspoon. Color Lie Rings and PBW Deformations of Skew Group Algebras. *J. Algebra* 518 (2019), 211-236
3. **S. Fryer**, M. Yakimov. Separating Ore sets for Prime Ideals of Quantum Algebras. *Bull. Lond. Math. Soc.* 49 (2017), no. 2, 202-215

4. K. Casteels, **S. Fryer**. From Grassmann necklaces to Restricted Permutations and Back Again. *Algebr. Represent. Theory* 20 (2017), no. 4, 895-921
5. **S. Fryer**. The Prime Spectrum of Quantum  $SL_3$  and the Poisson-prime Spectrum of its Semi-classical Limit. *Trans. London Math. Soc.* 4 (2017), no. 1, 1-29
6. **S. Fryer**. The  $q$ -Division Ring and its Fixed Rings. *J. Algebra* 402 (2014), 358-378

PREPRINTS

1. S. Agarwala, **S. Fryer**, K. Yeats. Combinatorics of the geometry of Wilson loop diagrams II: Grassmann necklaces, dimensions, and denominators. [arXiv:1910.12158](https://arxiv.org/abs/1910.12158)
2. S. Agarwala, **S. Fryer**, K. Yeats. Combinatorics of the geometry of Wilson loop diagrams I: equivalence classes via matroids and polytopes. [arXiv:1908.10919](https://arxiv.org/abs/1908.10919)
3. S. Agarwala, **S. Fryer**. A study in  $\mathbb{G}_{\mathbb{R}, \geq 0}$ : from the geometric case book of Wilson loop diagrams and SYM  $N = 4$ . [arXiv:1803.00958](https://arxiv.org/abs/1803.00958)

INVITED TALKS

- AMS Fall Western Sectional Meeting 2018 in San Francisco CA, *Special session on "Homological Aspects of Noncommutative Algebra and Geometry"*, October 27th 2018
- Joint Mathematics Meetings 2017 in Atlanta GA, *Special session on "New developments in noncommutative algebra and representation theory"*, January 7th 2017
- AMS-EMS-SPM International Meeting in Porto, *Special Session on "Combinatorics and Geometry of Quantum Algebras"*, June 13th 2015
- ARTIN meeting at University of Glasgow, *November 7th 2014*
- LMS Women in Mathematics Day, *April 25th 2014*
- ARTIN Young Researchers meeting at University of Newcastle, *March 28th 2014*

OTHER

- Conference Organizer: ARTIN Young Researchers Meeting, March 6-7th 2015
- Organising Committee: School of Mathematics Building Reopening Celebration 2015
- Athena Swan Committee Member: School of Mathematics postdoc representative, January 2015 - January 2016
- School of Mathematics Postdoc Forum Organiser: December 2014 - June 2016