

# Fiona Torzewska

## Curriculum Vitae

School of Mathematics  
University of Leeds  
Leeds, LS2 9JT, UK  
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🌐 [fionatorzewska.github.io](https://fionatorzewska.github.io)

### Education

- 2013–2017 **MPhys (Hons), Theoretical Physics, First Class**  
University of Leeds, UK
- 2017–2021 **PhD, Mathematics, Viva Dec 2021, Embedded cobordisms, motion groupoids and topological quantum field theory**, School of Mathematics, University of Leeds, UK  
Supervisors: Professor Paul Martin and Dr João Faria Martins  
Examiners: Professor Tara Brendle and Dr Andrew Brooke-Taylor

### Employment History

- 2022–2023 **Senior Research Associate, University of East Anglia**, Supervisor: Dr Vanessa Miemietz, EPSRC funded project: 2-representation theory and categorification, Dec 2022 - Mar 2023
- 2021–2022 **EPSRC Research Associate, University of Leeds**, Dec 2021 - Dec 2022
- 2019–2019 **JSPS Summer Program Fellow, Deguchi Lab, Ochanomizu University, Tokyo**, 10th June–21st August
- 2017–2021 **Teaching Assistant, University of Leeds**
- 2016 **Summer Research Placement: Adiabatic computation in abelian quantum doubles**, Supervisor: Professor Jiannis Pachos, School of Physics and Astronomy, University of Leeds, 13th June–5th August
- 2015 **Summer Research Placement: Hidden quantum markov models**, Supervisor: Dr Almut Beige, School of Physics and Astronomy, University of Leeds, 15th June–7th August

### Awards

- 2019 **JSPS Summer Program Fellowship**, Funding body: JSPS  
Project: From resistance distances to the Potts model.
- 2017 **Leeds Doctoral Scholarship**, Funding body: University of Leeds  
Funding for PhD.
- 2016 **School of Mathematics Excellence Scholarship**, Funding body: University of Leeds
- 2015 **Undergraduate Research and Leadership Scholarship**, Funding body: University of Leeds, Value: £6,000  
Funding for summer research placements and outreach activities, and some leadership training.

## Publications and preprints

- 2022 **Topological quantum field theories and homotopy cobordisms**, [arXiv:2208.14504](#) (submitted to Applied Catagorical Structures)
- 2021 **Embedded cobordisms, motion groupoids and topological quantum field theories**, *PhD Thesis*
- 2021 **Motion groupoids and mapping class groupoids**, *With: P.P.Martin and J.F.Martins*, [arXiv:2103.10377](#) (submitted to Communications in Mathematical Physics)
- 2020 **Non-ergodicity through quantum feedback**, *With: L.A.Clark, B.Maybee, A.Beige*, [EPL 130, 54002](#), (Undergraduate summer placement)

## Works in progress

**Classifying charge conserving representations of the loop braid group**, *With: P.P.Martin, E. Rowell*

**Motion groupoids and monoidal structures**, *With: P.P.Martin*

**From resistance distances to the Potts model**, *With: T.Deguchi*

## Talks

**Topological quantum field theories and homotopy cobordisms**

September 2022: 28th YAMCATS Meeting

**Motion groupoids and mapping class groupoids**

August 2022: 60th ARTIN Meeting

November 2021: Cardiff University Geometry, algebra, physics and topology seminar

November 2021: Indiana University Quantum topology seminar

**Motion groupoids and mapping class groupoids series**

Series of three lectures aimed at PhD students delivered as part of the LMS funded YAMCATS category theory and its applications series, available [here](#). (2020)

**Topological quantum field theories for cospan cobordisms**

November 2019: Glasgow geometry and topology seminar

November 2019: Leicester postgraduate conference in category theory and its applications (25 min version)

**(Flash Talk) TQFTs associated to finite groups: A topological quantum field theory for the category surface tangles**

April 2019: New Connections and Directions in Representation Theory and Related Topics

May 2019: Knots and Braids in Norway

**A finite total homotopy topological quantum field theory**

March 2019: Geometry and Topology GATEWAY seminar, *University of Warwick*

**Using model categories to construct topological quantum field theories**

March 2019: Low dimensional topology seminar, *RIMS, Kyoto*

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## Conferences

- 2022 **Quantum Topology and Geometry**, *Institut Henri Poincaré*, 13th-17th June  
**Bicategories, Categorification and Quantum Theory**, *University of Leeds*, 11th-15th July  
**Higher categories and topological order**, *American Institute of Mathematics, San Jose*, 26th-30th September
- 2020 **Introductory workshop: Quantum Symmetries**, *MSRI*, 27th-31st January  
**Winter Braids X**, *Università di Pisa*, 17th-21st February, (Poster and flash talk)  
**Women in Mathematical Physics**, *BIRS, Banff*, 21st-22nd September, Online
- 2019 **Winter Braids IX**, *Université de Reims*, 4th-7th March  
**New Connections and Directions in Representation Theory and Related Topics**, *University of Leeds*, 15th -17th April  
**Knots and Braids in Norway**, *NTNU, Trondheim*, 13th-17th May  
**Postgraduate conference in category theory and its applications**, *University of Leicester*, 18th-19th November, (Invited talk)
- 2018 **Quantum Computation and Information Workshop**, *Texas A&M University*, 20th-22nd Sept, (Presented poster)
- 2017 **Higher Structures Lisbon**, *Instituto Superior Técnico, Lisbon*, 24th-27th July

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## Teaching experience

- 2022 **Summer research project supervisor**, *University of Leeds*, With: P.Martin, J.Faria Martins, Project title: Links, Loop Braids and Topological Quantum Computing
- 2017–2021 **Teaching assistant**, *University of Leeds*
- Topology, Marker, *Spring 2021*
  - Introductory Linear Algebra (Joint Honours), Tutorial assistant, *Spring 2019*;
  - Groups and Vector Spaces, Tutorial assistant/Marker, *Autumn 2018, 2019, 2020*;
  - Rings and Polynomials, Marker, *Spring 2018, 2019, 2020*;
  - Special Relativity, Marker, *Autumn 2017*;
  - Sporadic lecture cover, 'Rings and Polynomials' and 'Groups and Symmetry';

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## Other professional experience

- 2021-2022 **Seminar organiser: Algebra seminar**, With: S.May (*Autumn 2021*), E.Faber (*2022*), School of Mathematics, University of Leeds
- 2019 **Conference organiser: Loops in Leeds: motion groups and related topics**, With: C.Damiani, J.Faria Martins, P.Martin, A.Bullivant, H.Albeladi, School of Mathematics, University of Leeds
- 2018 **Conference organiser: Higher Gauge Theory: Where should we look for higher gauge matter?**, With: J.Faria Martins, P.Martin, School of Mathematics, University of Leeds
- 2018–2019 **Seminar organiser: Pure postgraduate seminar**, With: J. Howe, School of Mathematics, University of Leeds