

# Jennifer Brown

## Curriculum Vitae

### Personal

 j.m.brown@ed.ac.uk

 English (Native), French (Fluent)

 jmhbrown.github.io

### Academic Positions

Sept. 2023 **Postdoctoral Research Associate**, *University of Edinburgh*, Edinburgh, UK  
Funded in part by the Simons Collaboration on Global Categorical Symmetries

Sept. 2022 - **NSF Postdoctoral Fellow**, *Yale University*, New Haven, Connecticut  
June 2023 Funded jointly by the mathematics department and NSF grant DMS-2202753

### Degrees

June 2022 **PhD, Mathematics**, *UC Davis*, Davis, California  
Dissertation: q-Holonomic Systems and Quantum Invariants  
Advised by Motohico Mulase

May 2013 **B.Sc, Physics and Mathematics**, *Georgetown University*, Washington, DC  
General Honors, Mathematics Honors

### Publications & Preprints

Jennifer Brown and David Jordan. Parabolic skein modules. May 2025. arXiv:2505.14836.

Jennifer Brown and Benjamin Haïoun. Skein categories in non-semisimple settings, June 2024. arXiv:2406.08956.

Jennifer Brown and Nathan Geer. Quantum invariants arising from  $U_h\mathfrak{sl}(2|1)$  are q-holonomic, March 2024. arXiv:2403.12882.

Jennifer M. Brown. *q-Holonomic Systems and Quantum Invariants*. Ph.d., University of California, Davis, United States – California, 2022.

Jennifer Brown, Tudor Dimofte, Stavros Garoufalidis, and Nathan Geer. The ADO invariants are a q-holonomic family, May 2020. arXiv:2005.08176.

Kai He, Jennifer Brown, Stephan Haas, and Marcos Rigol. Driven dipole oscillations and the lowest-energy excitations of strongly interacting lattice bosons in a harmonic trap. *Phys. Rev. A*, 89:033634, Mar. 2014.

Jennifer Brown. Parametric excitations of lattice hard-core bosons in a time-dependent harmonic trap. Master's thesis, Georgetown University, 2013. B.Sc. Honors Thesis.

### Awards & Fellowships

**Mathematical Sciences Postdoctoral Research Fellowship (MSPRF)**, National Science Foundation, September 2022 - August 2026  
DMS-2202753. \$150,000 USD. Intended to support future leaders in the mathematical sciences.

**Dissertation Year Fellowship**, UC Davis Graduate Studies, '21-'22 Academic Year  
12-month fellowship covering tuition, fees, and living expenses. Awarded to doctoral students demonstrating strong potential for university teaching and research.

**Junior Fellowship**, Institut Mittag-Leffler, September to December 2020

Travel, living expenses, and accommodation to support participation in the “Knots, Strings, Symplectic Geometry and Dualities” research program.

**Yueh-Jing Lin Award**, UCD Department of Mathematics, June 2020

\$2400 USD. Awarded to high-achieving mathematics students.

**Graduate Student Travel Award**, UCD Graduate Studies, December 2019

\$1500 USD. Awarded to support travel to Quito, Ecuador to run a workshop on Knot Theory.

**Hazel B. Jacoby Fellowship**, UCD Department of Mathematics, June 2019

\$4000 USD. Awarded to outstanding graduate students.

**GSA Travel Award**, UCD Graduate Student Association, January 2018

\$500 USD. Award to support travel to The Fields Institute for a workshop.

## Mini-Courses

- **Skein Theory and the Quantum A-polynomial**, 4 hours, June 16th - 20th, 2025

Global Categorical Symmetries Summer School at the SwissMAP Research Station. Les Diablerets, Switzerland.

- **Skein Theory**, 5 hours, May 20th - 24th, 2024

Atlantic TQFT Spring School at the Atlantic Algebra Center, Memorial University Newfoundland. St. Johns, Newfoundland, Canada.

## Invited Talks

- **Defects in Skein Theory**, 30 July, 2025

New perspectives on skein modules. CIRM, Luminy, France.

- **Cluster computations in parabolic skein modules**, 21 July, 2025

CAMP in the Lakes Conference. Ambleside, England.

- **The Quantum A-polynomial**, March 14th, 2025

Topology Seminar. Institut Fourier, Laboratoire de Mathématiques. Grenoble, France.

- **Skein Categories and Factorization Homology**, March 5th, 2025

CRC 1624 Seminar. University of Hamburg, Germany.

- **Skein Categories and Factorization Homology**, January 21st, 2025

Algebraic Geometry and Number Theory Seminar, UC Davis. Davis, California

- **Skein Categories in Non-semisimple Settings**, Janurary 13th, 2025

Topology Seminar, University of Southern California. Los Angeles, California.

- **Skein Categories for Non-semisimple Coefficients**, December 19th, 2024

Séminaire GADT at L’Institut de Mathématiques de Bourgogne. Dijon, France.

- **Non-Semisimple Skein Categories**, December 9th, 2024

Skein Days. Cergy-Pontoise, France.

- **Skein Theoretic Quantization of the A-polynomial**, December 5th, 2024

Geometry and Topology Seminar. Uppsala, Sweden.

- **Non-semisimple Skein Categories**, October 10th, 2024

Higher structures in Noncommutative Geometry and Quantum Algebra. Lille, France.

- **Defects and the A-polynomial**, September 4th, 2024

Recent Developments in Topological Quantum Field Theory at BIMSA. Beijing, China.

- **Quantizing the A-polynomial**, June 19th, 2024

Categorical symmetries in Quantum Field Theory at ICMS. Edinburgh, UK

- **Orthogonal Knot Invariants**, April 18th, 2024

Gauge Fields in Arithmetic, Topology and Physics at ICMS. Edinburgh, UK

- **Defects and Quantized Character Stacks**, October 17th, 2023

Workshop 23w5068 at the Banff International Research Station. Banff, Canada

- **Diagrammatics and Stratified Factorization Homology**, June 13th, 2023  
Séminaire de Géométrie et Topologie, Institut de Mathématiques de Toulouse, France.
- **Defects in Skein Theory**, May 17th, 2023  
Lisbon TQFTs Seminar. (Remote)
- **Skein Theory and Quantized Knot Invariants**, April 7th, 2023  
Séminaire de Groupes, Représentations et Géométrie, Institut de Mathématiques de Jussieu-Paris Rive Gauche. Paris, France.
- **Skein Theory and Quantizing Character Varieties**, October 19th, 2022  
Algebraic Geometry Seminar, University of Georgia. Athens, Georgia.
- **Skein Categories and Quantization**, April 13th, 2022  
Emerging Researchers in Category Theory Seminar, Topos Institute. (Remote)
- **Racks and Quantum Invariants**, March 12, 2021  
QMAP Seminar, UC Davis. Davis, CA.
- **Recursion Properties of Quantum Invariants**, October 2020  
Informal Research Seminar, Institut Mittag-Leffler. Djursholm, Sweden.
- **Knot Invariants, Quantum Groups, and the Knot Group**, December 17, 2019  
Greifswald Universitaet. Greifswald, Germany.

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## Contributed Talks

- **Computing the Quantum A-polynomial**, 23 June 2025  
GCS Summer Workshop. SwissMAP Research Station, Les Diablerets, Switzerland.
- **Functoriality proof**, 20 May 2025  
Spring School on Khovanov homology and exotic phenomena. Matemale, France.
- **Quantizing character varieties**, 28 August 2024  
Low Dimensional Topology Days. Nantes, France.
- **Building Blocks for the construction of exotic pairs**, 28 May 2024  
Matemale Spring School. Matemale, France.
- **The AJ Conjecture**, 28 February 2024  
Structures & Symmetries Theme Day, Edinburgh School of Mathematics.
- **Defects in Skein Theory**, 20 November 2023  
Global Categorical Symmetries Postdoc Colloquium. (Remote.)
- **Skeins and Quantization**, 7 October 2022  
MFO Miniworkshop, Oberwolfach, Germany.
- **Quantum Moment Maps**, 19 May 2022  
Matemale Spring School, Institut de Mathématiques de Toulouse. Matemale, France.
- **Measuring Recursion**, 24 May 2021  
WAM Postdoc Seminar, Institute for Advanced Study. (Remote)
- **Cluster Structures**, 26 March 2021  
Clusters Seminar, UC Davis. Davis, CA.
- **Cluster Algebras: Total Positivity**, 12 March 2021  
Clusters Seminar, UC Davis. Davis, CA.
- **C2 Algebras**, 3 March 2021  
Vertex (Operator) Algebra Reading Seminar, University of Edinburgh. Edinburgh, UK.
- **The Fundamental Quandle and Braiding in Categories**, 21 January 2021  
Student-Run Research Seminar, UC Davis. Davis, CA.
- **Recursion Properties of Quantum Knot Invariants**, 1 October 2019  
Student-Run Research Seminar, UC Davis. Davis, CA.

- **K-Theory and the A-polynomial**, 20 May 2019  
Qualifying Exam Talk, UC Davis. Davis, CA.
- **Paired classical and quantum knot invariants and a K-theory clue for Heisenberg quantization.**, 24 October 2018  
Student-Run Research Seminar, UC Davis. Davis, CA.
- **K-Theory for C\*-Algebras: Crossed Products**, 3 April 2018  
Anyons Working Seminar, UC Davis. Davis, CA.
- **K-Theory for C\*-Algebras: Introduction**, 9 January 2018  
Anyons Working Seminar, UC Davis. Davis, CA.

## Teaching

- 2020 - 2021 **Calculus Room Coordinator**, *UCD Mathematics Department*  
Ran the department's calculus tutoring center, overseeing operations for over 80 graduate students serving over 3000 calculus students.
- 2016 - 2020 **Teaching Assistant**, UC Davis Mathematics Department, Courses: Calculus I, Calculus II, Vector Analysis, Differential Equations, Mathematics & Computers, Physical Mathematics  
Led weekly discussion sections for undergraduate courses. Covered main lectures as needed, administered exams and quizzes, graded, and held weekly office hours.
- Summer 2018 **Instructor**, UC Davis Mathematics Department, Course: Differential Equations  
Taught intensive summer course on ordinary differential equations. 4.5 weekly hours of instruction, 2 office hours per week. Wrote all lecture notes, homework assignments, and exams. Graded all exams.

## Ongoing Service

- Summer 2025 **Count-Me-In Project Lead**, *University of Edinburgh School of Mathematics*  
Work with a post-graduate student to mentor a group of undergraduate students on an independent research project. Design project, provide guidance in weekly meetings.
- 2024 - 2025 **Global Categorical Symmetries Summer Program Co-organizer**, *SwissMap Research Station, Les Diablerets, Switzerland*, Funded by the SwissMap Research Station and the Simon's Foundation.  
Co-organizing summer school and workshop for members of the Simon's Collaboration on Global Categorical Symmetries.
- 2023 - 2025 **STOAT Conference Co-organizer**, *Glenmore, Scotland*, Funded by ARTIN network.  
Co-organizing a participant-led workshop on advanced topics in algebraic topology held in the Scottish Highlands. Year 1: Extensions of fusion 2-categories. Year 2: Exotic structures and skein lasanga modules.
- 2023 - 2025 **Algebra Seminar Co-organizer**, *University of Edinburgh School of Mathematics*  
Coordinated departmental algebra seminar. Finding speakers, extending invitations and coordinating seminar lunches and dinners.

## Past Service

- Summer 2021, 2022 **REU Program Assistant**, *UCD Mathematics Department*  
Supported a summer research program for 13 undergraduates. Helped organize and run field trips, handled bike assembly and repairs, mentored students on their individual projects.
- Spring 2021 **Cluster Algebras Seminar Organizer**, *UCD Mathematics Department*  
Organized a weekly student seminar on cluster algebras.
- 2020 - 2021 **Mentor**, *UCD Mathematics Department*  
One-on-one mentoring for mathematics undergraduates and recent graduates from underrepresented groups, specifically women, people of color, and first generation students. Supported graduate applications and research ambitions.
- 2018 - 2020 **President**, *The Math and Applied Math Galois Group*  
Ran the mathematics graduate student association at UC Davis. Organized events, oversaw all graduate office assignments within the department. Point of contact for graduate concerns.

Fall 2011 **Volunteer Instructor, US State Department - EducationUSA Accra**

Taught introductory mathematics and physics in classroom settings and with small groups. Advised Ghanaian high school graduates pursuing higher education in the United States.

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## Non-academic Positions

- 2017 - 2020 **Wilderness Guide**, *UC Davis Outdoor Adventures*, Part Time Volunteer Position.  
Led weekend backpacking and snow-camping trips for small groups.
- 2013 - 2016 **Data Infrastructure Engineer**, *Opower (Oracle Subsidiary)*  
Designed, built, and managed both MySQL and Hadoop/Hbase based distributed compute and storage infrastructure. Built-out monitoring and provisioning systems, maintained tooling and cluster job code in Java, Ruby, Python and Bash. Served as on-call engineer.
- Summer 2010 **Trekking Co-director**, *Boy Scouts of America*  
Organized and ran week-long backpacking trips in the California's Sierra Nevada. Responsibilities included all meal planning and preparation, route setting, coordination with base camp staff, wilderness medical care, organizing service projects and educational programs.
- Summer 2007, 2008 **Sports Director, Head Stewart**, *Boy Scouts of America*  
Lead a small team in designing and running outdoor educational programs. Managed inventories, organized meals for 200+ scouts in cooperation with kitchen staff. Administered first aid and organized service projects.
- 2001 - 2008 **Youth Leader**, *Girl Scouts of America - Backpacking Interest Group*, Part Time Volunteer Position  
Helped plan and lead backpacking trips for pre-teen and teenage girls. Maintained backpacking equipment, obtained permits, and administered first aid.

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## Invited Workshops & Programs

- **Higher structures in Noncommutative Geometry and Quantum Algebra**, October 8th - 11th, 2024, With support from organizers.  
Laboratoire de mathématiques Paul Painlevé, Université de Lille, France.
- **Conference on Recent Developments in Topological Quantum Field Theory**, September 2nd - 7th, 2024, With support from organizers.  
Beijing Institute for Mathematical Sciences and Applications (BIMSA). Huairou District, Beijing, China.
- **Categorical symmetries in Quantum Field Theory Summer School & Workshop**, June 10th - 21st, 2024  
International Center for Mathematical Sciences, Edinburgh, UK.
- **Gauge Fields in Arithmetic, Topology, and Physics**, April 15th - 19th, 2024  
International Centre for Mathematical Sciences, Edinburgh, UK.
- **Simons Collaboration on New Structures in Low-Dimensional Topology Annual Meeting**, March 28th-29th, 2024, With support from the organizers  
Flatiron Institute, New York City, New York.
- **Simons Collaboration on Global Categorical Symmetries Annual Meeting**, November 16-17, 2023, With support from the organizers  
Flatiron Institute, New York City, New York.
- **Complex Lagrangians, Mirror Symmetry, and Quantization**, October 15 - 20, 2023  
Banff International Research Station, Banff, Canada.
- **Quantum Invariants and Low-Dimensional Topology**, August 14 - 18, 2023  
American Institute of Mathematics (AIM), Pasadena, California.
- **Quantization of Complex Symplectic Varieties**, October 2 - 8, 2022  
MFO, Oberwolfach, Germany.
- **Geometric Structures (re)United, Higgs Bundles, Geometric Structures, and Character Varieties**, June 13 - 17, 2022, *With support from the organizers*  
University of Illinois at Chicago.
- **Recent Developments in Representation Theory and Mathematical Physics**, March 20 - 26, 2022  
MFO, Oberwolfach, Germany.

- **Representation Theory: Categories and Combinatorics**, May 22 - 28, 2021, *Terng Lecture Teaching Assistant*  
Institute for Advanced Study. (Remote)
- **Knots, Strings, Symplectic Geometry and Dualities**, September 30 - December 11, 2020, *With fellowship support from the organizers*  
Institut Mittag-Leffler. Djursholm, Sweden.
- **Graduate Summer School: Quantum Field Theory and Manifold Invariants**, June 30 - July 20, 2019, *With support from the organizers*  
Park City Mathematics Institute. Park City, Utah.
- **QFT for Mathematicians**, June 17 - 28, 2019, *With support from the organizers*  
Perimeter Institute. Waterloo, Canada.
- **Séminaire de Mathématiques Supérieures 2018: Derived Geometry and Higher Categorical Structures in Geometry and Physics**, June 11 - 22, 2018, *With support from MSRI and the UC Davis GSA*  
The Fields Institute. Tornoto, Canada

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## Other Conferences & Workshops

- **Scottish Talbot On Algebra and Topology**, September 23rd - 27th, 2024, *Co-organizer.*  
Cairngorm Lodge, Glenmore, Scotland
- **ARTIN 62**, September 12nd - 13th, 2024, *With support from organizers. Meeting of the Algebra and Representation Theory in the North (ARTIN) research network*  
Newcastle University, England.
- **Low Dimensional Topology Days**, August 26th - 30th, 2024, *Annual meeting of the Réseau Thématisé RTop Topologie algébrique et Géométrique*  
Nantes Université, France.
- **Matemale Spring School on New constructions of exotic 4-manifolds**, May 27-31, 2024  
Matemale, France
- **WinterBraids XIII - School on Braids and Low Dimensional Topology**, February 6 - 9, 2024  
Institut Montpelliérain Alexander Grothendieck, France
- **NYU Satellite Meeting**, November 14-15, 2023, *Pre-meeting for Simons Collaboration Annual Meeting.*  
New York University, New York.
- **TQFTs and Their Connections to Representation Theory and Mathematical Physics**, June 19 - 23, 2023  
Hausdorff School of Mathematics, Bonn, Germany.
- **Winter Braids XII - School on Braids and Low Dimensional Topology**, February 21 - 24, 2023  
Université de Tours, Fance.
- **Learning Workshop on BPS States and 3-Manifolds**, Feb. 27 - March 3, 2023  
International Centre for Theoretical Physics, Trieste, Italy.
- **Matemale Spring School on Witten's finiteness conjecture for skein modules**, May 16 - 20, 2022, *With support from the organizers*  
Matemale, France
- **Women at the Intersection of Math and Theoretical Physics**, February 22 - 25, 2021  
Perimeter Institute. (Remote)
- **Higher Categories and Categorification**, February 10 - 14, 2020  
MSRI. Berkeley, California

- **Quantum Symmetries**, January 27 - 31, 2020  
MSRI. Berkeley, California
- **Integrability, Geometry and Moduli**, July 29 - August 2, 2019, *With support from the organizers.*  
Max Planck Institute for Mathematics. Bonn, Germany.
- **Chiral Algebras for the 21st Century**, April 15 - 19, 2019  
Davis, California
- **Derived Algebraic Geometry and its Applications**, March 25 - 29, 2019  
MSRI. Berkeley, California
- **Derived Algebraic Geometry, Birational Geometry and Moduli Spaces**,  
January 28 - February 8, 2019  
MSRI. Berkeley, California
- **International Congress of Mathematicians**, August 01 - 09, 2018, *With support from the NSF grant of Motohico Mulase*  
Rio de Janeiro, Brazil
- **XIX International Congress on Mathematical Physics**, July 23 - 28, 2018, *With support by the NSF grant of Evans Harrell*  
Montreal, Canada
- **Summer School on Current Topics in Mathematical Physics**, July 17 - 21, 2017, *With support from the organizers*  
Universität Zürich. Zurich, Switzerland.
- **Connections for Women: Geometric and Arithmetic Aspects of Homogeneous Dynamics**, January 29 - 30, 2015  
MSRI. Berkeley, California

## Internships

2012 - 2013 **Research Assistant, G.U. Physics Department**

Worked under Professor Marcos Rigol. Studied hard-core lattice bosons in modulated trapping potentials. Implemented simulations in C/C++, managed, processed and interpreted data.

Summer 2012 **Summer Student, CERN**

Worked with the LHCb online control group in preparation for the 2013 LHC upgrade. Prototyped custom networking hardware for measuring network latencies with nanosecond accuracy using FPGAs. Presented work in an internal communication.

2010 - 2012 **Research Assistant, G.U. Mathematics Department**

Worked under Professor Judith Miller. Researched effects of migration on the genetic architecture of populations, specifically the phenomenon of mutation surfing. Designed computer simulations, interpreted results and worked on data processing. Presented results in regular reports and at a conference.