Jennifer Brown

Curriculum Vitae

Personal

- ✉ j.m.brown@ed.ac.uk
- 🖵 jmhbrown.github.io
- 💬 *English (Native), French (C1)*

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 - June 2023   **NSF Postdoctoral Fellow**, *Yale University*, New Haven, Connecticut
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 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. Two years of funding, including a large research allowance. 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
Awarded to high-achieving mathematics students.

Graduate Student Travel Award, UCD Graduate Studies, December 2019
Awarded to support travel to Quito, Ecuador to run a workshop on Knot Theory.

Hazel B. Jacoby Fellowship, UCD Department of Mathematics, June 2019
Awarded by the Department of Mathematics for the purpose of recruiting and retaining outstanding graduate students.

GSA Travel Award, UCD Graduate Student Association, January 2018
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

- **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 Mathématics 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 Géomètrie, 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.

Contributed Talks

- **Quantizing character varieties**, August 28th, 2024
  Low Dimensional Topology Days. Nantes, France.

- **Building Blocks for the construction of exotic pairs**, May 28th, 2024
  Matemale Spring School. Matemale, France.

- **The AJ Conjecture**, February 28th, 2024
  Structures & Symmetries Theme Day, Edinburgh School of Mathmetics.

- **Defects in Skein Theory**, November 20th, 2023
  Global Categorical Symmetries Postdoc Colloquium. (Remote.)

- **Skeins and Quantization**, October 7th, 2022
  MFO Miniworkshop, Oberwolfach, Germany.

- **Quantum Moment Maps**, May 19th 2022
  Matemale Spring School, Institut de Mathematiques de Toulouse. Matemale, France.

- **Measuring Recursion**, May 24, 2021
  WAM Postdoc Seminar, Institute for Advanced Study. (Remote)

- **Cluster Structures**, March 26, 2021
  Clusters Seminar, UC Davis. Davis, CA.

- **Cluster Algebras: Total Positivity**, March 12, 2021
  Clusters Seminar, UC Davis. Davis, CA.
- **C2 Algebras**, March 3, 2021
  Vertex (Operator) Algebra Reading Seminar, University of Edinburgh. Edinburgh, UK.
- **The Fundamental Quandle and Braiding in Categories**, January 21, 2021
  Student-Run Research Seminar, UC Davis. Davis, CA.
- **Recursion Properties of Quantum Knot Invariants**, October 1, 2019
  Student-Run Research Seminar, UC Davis. Davis, CA.
- **K-Theory and the A-polynomial**, May 20, 2019
  Qualifying Exam Talk, UC Davis. Davis, CA.
- **Paired classical and quantum knot invariants and a K-theory clue for Heisenberg quantization.**, October 24, 2018
  Student-Run Research Seminar, UC Davis. Davis, CA.
- **K-Theory for C*-Algebras: Crossed Products**, April 3, 2018
  Anyons Working Seminar, UC Davis. Davis, CA.
- **K-Theory for C*-Algebras: Introduction**, January 9, 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-organizeing 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.

Non-academic Postitions

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.

- **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

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 Thématique 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-Manfiolds**, 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**, Janurary 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.