

Kürsat Sözer

CONTACT INFORMATION Laboratoire Paul Painlevé, Email:kursat.sozer@univ-lille.fr
Université de Lille
Building M2, Office: 310
Lille, France

WEBPAGE

RESEARCH INTEREST Quantum invariants of low-dimensional manifolds, topological field theories, homotopy field theories, cobordism hypothesis, homotopy self-equivalences of higher-dimensional manifolds, Hopf algebras, fusion and modular categories, and crossed modules

EDUCATION

Indiana University Bloomington

Ph.D. in Mathematics, August 2014 – May 2020
Advisor: Vladimir Turaev

Middle East Technical University (Ankara)

B.S. in Mathematics, September 2009 – June 2014
• Magna cum laude
Minor in Physics, January 2010 – June 2014

EMPLOYMENT

Université de Lille, Laboratoire Paul Painlevé, CNRS Postdoctoral Fellow Sep 2025 –
McMaster University, Department of Mathematics & Statistics Postdoctoral Fellow, Sep 2022 – Aug 2025
École Polytechnique Fédérale de Lausanne, Laboratory for Topology and Neuroscience, OCHoTop Postdoctoral Fellow Sep 2021 – Aug 2022
Université de Lille, Laboratoire Paul Painlevé, OCHoTop Postdoctoral Fellow Sep 2020 – Aug 2021

PAPERS AND PREPRINTS

- ▶ *Braidings of Self-Equivalences and Bordism* (with I. Hambleton and R. Sroka), in preparation.
- ▶ *Quantum invariants of flat 2-bundles over 3-manifolds* (with A. Virelizier), in preparation.
- ▶ *3d-TQFTs and 3-manifold invariants* (with A. Virelizier), , Encyclopedia of Mathematical Physics 2nd Edition.
- ▶ *Hopf crossed module (co)algebras* (with A. Virelizier), Journal of Pure and Applied Algebra, 229:11 (2025) 108083.
- ▶ *Monoidal categories graded by crossed modules and 3-dimensional HQFTs* (with A. Virelizier), Advances in Mathematics, 428 (2023) 109155.
- ▶ *Two-dimensional extended homotopy field theories*, Algebraic & Geometric Topology, 23:9 (2023) 3909–3996.

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|-----------------------------------|---|---------------------------|
| SEMINAR TALKS: RESEARCH | Université de Lille Topology Seminar | Feb 13, 2026 |
| | Bilkent University Topology Seminar | May 5, 2025 |
| | McMaster University Colloquium, Post-Doc Threads | Jan 24, 2025 |
| | University of Alberta Geometry-Algebra-Physics (GAP) Seminar | Dec 4, 2024 |
| | Bilkent University Mathematics Departmental Talk | Apr 2, 2024 |
| | Middle East Technical University Topology Seminar | Jan 2, 2024 |
| | Middle East Technical University General Seminar | Dec 28, 2023 |
| | Ohio State University Quantum Symmetry Seminar | Apr 13, 2023 |
| | McMaster University Topology Seminar | Sep 15, 2022 |
| | OCHoTop Online Seminar | Feb 19, 2021 |
| | UCGEN Online Seminar | Jan 20, 2021 |
| | EPFL Topology Seminar | Nov 3, 2020 |
| | University of Southern California Geometry, Topology, and Cate- gorification Seminar | Feb 3, 2020 |
| | Université de Lille Topology Seminar | Jan 30, 2019 |
| | Michigan State University Topology Seminar | Oct 1, 2018 |
| | Indiana University Bloomington Topology Seminar | May 25, 2018 |
| CONFERENCE (MEETINGS) TALKS | Turkic Union of Research and Academic Network (Turkish, virtual) | Feb 7, 2026 |
| | Banff International Research Station / Casa Matemática Oaxaca Workshop: Equivariant Topological Quantum Field Theory | Sept 9, 2025 |
| | Physics Latam: Mathematics and High Energy Physics Seminar (4-lecture online mini-course) | July 1, 3, 8, 10, 2025 |
| | 2025 CMS Summer Meeting at Université Laval | June 7, 2025 |
| | Moduli and Friends (virtual talk) | May 27, 2024 |
| | Quantum Symmetries at the CRM (Contributed talk) | Oct 12, 2022 |
| | Quantum Topology and Geometry conf. in honor of V. Turaev | June 17, 2022 |
| | QuaSy-Con at Univ. of Illinois Urbana-Champaign (Contrib. talk) | Nov 9, 2019 |
| | AMS Sectional Meeting at Binghamton University (Contrib. talk) | Oct 12, 2019 |
| | Young Topologist Meeting at EPFL (Contributed talk) | July 23, 2019 |
| | GSTGC at Univ. of Illinois Urbana-Champaign (Contrib. talk) | Mar 31, 2019 |
| | Aspects of Higher Repres. Theory at Brussels (Contrib. talk) | Jan 22, 2019 |
| | Higher Str. in Holomorphic and Topological Field Theory at IHES (Contrib. talk) | Jan 16, 2019 |

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| TEACHING | <u>At McMaster University</u> | |
| | MATH-3T03 Inquiry in Topology (Lecturing) | Winter 2025 |
| | MATH-1B03 Linear Algebra I (Lecturing) | Fall 2024 |
| | MATH-1B03 Linear Algebra I (Lecturing) | Spring 2024 |
| | MATH-3T03 Inquiry in Topology (Lecturing) | Fall 2023 |
| | MATH-2ZZ3 Engineering Mathematics 4 (Lecturing) | Winter 2023 |
| | MATH-3T03 Inquiry in Topology (Lecturing) | Fall 2022 |
| | <u>At EPFL</u> | |
| | MATH-110(a) Advanced Linear Algebra I (Assisting) | Fall 2021 |
| | Participated in Teaching Toolkits for Exercises 1-2 seminars | Sept 2021 |
| | Presented Polya's problem-solving method to assistants | Sept 2021 |
| | <u>At Indiana University Bloomington</u> | |
| | M435-Introduction to Differential Geometry (Grading) | Spring 2020 |
| | M303-Linear algebra and M311-Calculus 3 help sessions (Assisting) | Spring 2020 |
| | M27-Precalculus with Trigonometry (Lecturing) | Fall 2019 |
| | M25-Precalculus (Lecturing) | Spring 2016 |
| | M311-Calculus 3 (Recitation) | Fall 2016 |
| | T336-Topics in Euclidean Geometry (Grading) | Fall 2016 |
| | M521-Topology (Grading) | Fall 2016 |
| | M311-Calculus 3 (Recitation) | Fall 2015 |
| M321-Intuitive Topology (Grading) | Fall 2015 | |
| T336-Topics in Euclidean Geometry (Grading) | Fall 2015 | |
| M413-Introduction to Analysis (Grading) | Fall 2014 | |
| MENTORING | Directed Reading Program in Türkiye for undergraduates in and around Türkiye on Hausdorff Topological Spaces | Summer 2023 |
| | Mentoring Donghan Wang for his master's thesis at EPFL | Spring 2022 |
| | Directed Reading Program for undergraduates at IU Bloomington on Knots and 3-manifolds | Spring 2019 |
| | Directed Reading Program for undergraduates at IU Bloomington on Differential Forms and de Rham Cohomology | Spring 2017 |
| ORGANIZATION | Geometry and Topology seminar at McMaster University | Fall 2023 |
| | Reading Seminar at McMaster on Cobordism Thy (with R. Sroka) | Winter 2023 |
| | Local seminar at EPFL among the topology group | Spring 2022 |
| | Graduate Student Topology and Geometry Conference 2020 at IU Bloomington (Leading co-organizer); postponed due to COVID-19 | April 2020 |
| | IU Grad. Student Knot Theory and TQFT Seminar (Co-organizer) | Spring 2017 |
| | Grad. Student Topology-Geometry Confer. at IU (Co-organizer) | 2016 |
| HONOURS AND AWARDS | Outstanding Thesis Award (one of the three awardees) | 2020 |
| | AMS Graduate Student Travel Award | 2019 |
| | Hazel King Thompson Summer Reading Fellowship | 2017, 2019 |
| | Indiana University Graduate Fellowship | 2015 |
| | Fulbright Fellowship Awardee | 2013 |
| | Middle East Technical University High Honor List | 2010-2014 |

GRADUATE
COURSEWORK

- Complex Variables 1-2
- Metric Geometry
- Commutative Algebra
- Algebraic Topology 1-2
- Lie Algebras & Lie Groups 1-2
- Geometric Topology 1-2
- Homotopy Type Theory
- Group Representations
- Quantum Topology
- Etale Cohomology
- Reidemeister Torsion
- Theory of Gravitation
- Symplectic Geometry and 4-manifolds
- Rational Billiards and Teichmüller Dynamics (nonregistered)
- Surface homeomorphisms; topology, geometry, analysis (nonregistered)
- Calculus of Functors (nonregistered)
- Representation varieties of 2- and 3-manifold groups (nonregistered)
- Derived categories (nonregistered)

LANGUAGES

Turkish (Native), English (Fluent), French (Intermediate)

CITIZENSHIP

Turkey