

Sherry Gong

Contact Information:

Texas A&M University Department of Mathematics

Email: sgongli@tamu.edu

Research Interests:

Gauge theory, Floer theory, and low dimensional topology

Operator algebras, K -theory, geometric group theory, and non-commutative geometry

Employment:

MSRI Research Member, Fall 2022.

Texas A&M University, Assistant Professor, 2021-Present

Stanford University, Maryam Mirzakhani Postdoctoral Fellow, 2020-2021.

University of California Los Angeles, Hedrick Assistant Adjunct Professor, 2018-2020

Education:

Massachusetts Institute of Technology, Ph.D. in mathematics under Tomasz Mrowka, June 2018.

Cambridge University, MAST in Mathematics, with distinction 2012.

Harvard University, A.B., Summa cum laude in Mathematics, 2011.

Grants, Awards, scholarships:

NSF Career Award M2402085, PI, 2024-2029.

NSF Grant DMS-2055736, PI, 2021-2024, inherited from Jianchao Wu.

NSF Graduate Student Fellowship, 2014-2017.

Gates Cambridge Fellow, 2011-2012.

Elected to Phi Beta Kappa, 2011.

Wister Prize, 2011.

Alice T. Schafer Prize, awarded by the AWM, 2011.

John Harvard Scholarship, 2009.

Harvard College Scholarship, 2008, 2010.

International Mathematical Olympiad: Gold Medal, 2007; Silver Medal, 2005, 2004; Bronze Medal, 2003.

International Physics Olympiad: Silver Medal, 2006.

Papers:

1. *Families of metrics with positive scalar curvature on spectral sequence cobordisms*, <https://arxiv.org/abs/2310.02552>, accepted, *Journal of Topology and Analysis*, 2023.
2. *Non-orientable link cobordisms and torsion order in Floer homologies* (with Marco Marengon), *Algebraic & Geometric Topology* 23.6 (2023): 2627-2672.
3. *On the Kronheimer-Mrowka concordance invariant*, *Journal of Topology*, 2021 14(1):1-28
4. *The Novikov conjecture, the group of volume preserving diffeomorphisms and Hilbert-Hadamard spaces* (with Jianchao Wu and Guoliang Yu), *Geometric and Functional Analysis* volume 31, pages206–267 (2021)
5. *Khovanov homology and binary dihedral representations for marked links*, *Journal of Geometry and Physics* (2019) Volume 140, Pages 214-245.
6. *Property RD and the Classification of Traces on Reduced Group C^* -algebras of Hyperbolic Groups*, *Journal of Topology and Analysis*, (2017) Volume 9, Issue 4, Pages 707-716.
7. *Finite part of operator K -theory for groups with rapid decay*, *Journal of Noncommutative Geometry*, (2015) Volume 9, Issue 3, Pages 697-706.
8. *Computational approaches to Poisson traces associated to finite subgroups of $Sp(2n, C)$* (with Pavel Etingof, Aldo Pacchiano, Qingchun Ren, and Travis Schedler), *Experimental Mathematics*, (2012) Volume 21, Issue 2, Pages 141-170.
9. *On Congruence Conditions for Primality* (with Scott Kominers), *INTEGERS: The Electronic Journal of Combinatorial Number Theory*, (2010) Volume 10, Issue 3, Pages 313-317.
10. *On a problem regarding coefficients of cyclotomic polynomials*, *Journal of Number Theory*, (2009) Volume 129, Issue 12, Pages 2883-3114.

Preprints:

1. *On the rank of knot homology theories and concordance* (with Nathan M. Dunfield, Thomas Hockenhull, Marco Marengon, Michael Willis), <https://arxiv.org/abs/2010.06577>, 2023.
2. *The Novikov conjecture, the group of diffeomorphisms and continuous fields of Hilbert-Hadamard spaces* (with Jianchao Wu, Zhizhang Xie, Guoliang Yu), <https://arxiv.org/abs/2310.01219>,
3. *An A_∞ category from instantons* (with Ko Honda), preprint.
4. *Ribbon concordances and slice obstructions: experiments and examples* (with Nathan M. Dunfield), preprint.

Invited Talks:

UIUC Groups, Geometry and Topology Seminar, February 2024

UT Austin Topology Seminar, January 2024

Workshop on exotic 4-manifolds, Stanford, December 2023,

MIT Geometry and Topology Seminar, December 2023,

Colloquium, Purdue University, Dept of Mathematics, November 2023

Noncommutative Geometry Festival, Washington University, June 2023

The Second Australia-China-Japan-Singapore-U.S. Index Theory Conference, University of Tokyo, May 2023.

Canadian Operator Symposium, London, Ontario May 2023.

Conference: Gauge Theory and Low Dimensional Topology, University of Miami IMSA, April 2023

University of Houston Analysis Seminar, Houston, March 2023

Conference on Noncommutative Geometry and Geometric Analysis, Bogota, December 2022.

Knot concordance invariants from instantons, What Is Seminar, MSRI Analytic and Geometric Aspects of Gauge Theory, December 2022.

Floer Homotopical Methods in Low Dimensional and Symplectic Topology, MSRI Floer Homotopy, November 2022.

Computer science for knotty math problems, Dublin Institute for Advanced Studies, November 2022.

Georgia Tech and UGA Joint Topology Seminar, October 2022.

Conference on Low-Dimensional Topology and Homeomorphism Groups, Brin Mathematics Research Center, University of Maryland, September 2022.

Introductory Workshop: Analytic and Geometric Aspects of Gauge Theory, MSRI, August 29-Sept 2, 2022. (Gave a series of two introductory lectures on instanton Floer homology aimed at graduate students.)

Connections Workshop: Analytic and Geometric Aspects of Gauge Theory, MSRI, August 2022.

Young Mathematicians in Noncommutative Geometry and Analysis workshop, Texas A & M University, August 2022.

Oberwolfach Workshop on Non-commutative geometry and cyclic homology, Mathematisches Forschungsinstitut Oberwolfach, Germany, August 2022.

NYC Noncommutative Geometry Seminar, June 2022.

Great Plains Operator Theory Symposium, Washington University in St. Louis, May 2022.

Joint Math Meetings, AMS-AWM Special Session: Women and Gender Minorities in Sym-

plectic and Contact Geometry III, 45 minute talk, April 2022.

Interactions of gauge theory with contact and symplectic topology in dimensions 3 and 4, BIRS, March 2022.

Stanford Topology Seminar, January 2022.

Washington University in St Louis, Geometry and Topology Seminar, November 2021.

University at Buffalo Analysis Seminar, November 2021.

Georgia Topology Conference, June 2021.

AMS Section Meeting, Special Session on Gauge Theory, Geometry, and Low-Dimensional Topology, March 2021.

University of Bonn Topology Seminar, January 2021.

Purdue Operator Algebras Seminar, December 2020.

Gauge Theory Virtual Seminar, October 2020.

Princeton Topology Seminar, April 2020 (Virtual).

MIT Geometry and Topology Seminar, March 2020 (Virtual).

K-theory and C^* -algebras Conference, University of Hawai'i-Manoa, Dec 2019.

AWM Session on Geometry and Dynamics, AMS Section Meeting, UC Riverside, November 2019

East Coast Operator Algebra Symposium, The Ohio State University, October 2019.

AMS Section Meeting, Special Session, "Floer Homology in Dimensions 3 and 4", University of Wisconsin, September 2019.

Triangle Topology Seminar, NCSU, September 2019.

University of Virginia, Operator Theory Seminar, September 2019.

University of Virginia, Geometry Seminar, September 2019.

Texas A&M University, Noncommutative Geometry Seminar, August 2019.

Soochow University, Functional Analysis Mini-Symposium, August 2019.

Noncommutative Geometry Conference, Shanghai Center for Mathematical Sciences, Shanghai, June 2019.

Index theory, Duality and Related Fields Conference, Chern Institute, Tianjin, June 2019.

International Congress of Chinese Mathematicians, Tsinghua University, Beijing, June 2019

Noncommutative Geometry Festival, Washington University, St. Louis, May 2019.

UCLA Topology Seminar, UCLA, April 2019.

Brazos Analysis Seminar, University of Houston, March 2019.

Texas Geometry and Topology Conference, Texas Christian University, February, 2019.
Texas A&M University, Noncommutative Geometry Seminar, November 2018.
AMS Special Session on Interactions Between Contact and Symplectic Geometry and Low-dimensional Topology, November 2018.
Joint LA Topology Seminar, USC, November 2018.
Caltech Geometry and Topology seminar, Caltech, November 2018.
Shanghai Jiao Tong University, Topology Seminar, August 2018.
International Workshop on Operator Theory and its Applications (Shanghai) July 2018.
Workshop on Noncommutative Geometry and Index Theory, (TAMU) May 2018
AMS Special Session on Quantum link invariants, Khovanov homology, and low-dimensional manifolds, January 2018.
Columbia University, Topology seminar, November 2017.
Texas A&M University, Noncommutative Geometry Seminar, September 2017.
MCA Special Session on Noncommutative Geometry and Quantization, July 2017.
Fudan University, July 2017.
AMS Special Session on Floer Theoretic Invariants of 3-manifolds and Knots, October 2016.
Boston Graduate Topology Seminar, MIT, September 2016.
Workshop on 3-manifolds and Floer theories, University of Regensburg, July 2016.
Non Commutative Geometry Festival, Texas A&M University, May 2014.
East China Normal University, August 2013.

Teaching experience:

Assistant Professor at Texas A&M University:

- Linear Algebra, Fall 2021, Spring 2023.
- Algebraic Topology II, Spring 2023.

Instructor at UCLA:

- Abstract algebra, Fall 2019
- Algorithms, Fall 2019
- Real Analysis, Fall, Spring, 2018, Winter 2020.
- Multivariable Calculus, Winter 2018, Winter 2020
- Calculus, Fall 2018.

Teaching Assistant of the MIT course on Multivariable Calculus (18.02), Fall 2015.

Service:

Co-organizer of Texas A&M Topology seminar 2021-Present.

Co-organizer of Texas A&M Geometry seminar 2021-Present.

Co-organizer of Stanford Topology Seminar 2020-2021.

Member of USA(J)MO Editorial Board, 2019-Present.

Member of AIME Editorial Board, 2019-Present.

Reviewer for zbMATH, 2019-Present.

Outreach:

Co-founder and co-organizer of PreMa high school research program at Texas A&M University, 2023-current.

Co-Founder, co-organizer and instructor of G2 Math Program, a high school camp for girls to learn olympiad-style mathematics. 2022-current.

Problem Selection Committee Member and Coordinator of the Pan-American Girls' Math Olympiad, 2022.

Coordinator of the Pan-American Girls' Math Olympiad, 2021.

Instructor for Puerto Rican Math Olympiad Program, Spring 2015, Summer and Fall 2020.

Organizer and sole instructor at Pre-MOP program to help girls acclimate at MOP, Summer 2020

Volunteer computer programming instructor for a semester-long course at BEAM, a program for advanced students from socioeconomically underprivileged communities, Fall 2019

Instructor, Yau Summer School for High School Students, Tsinghua, August 2019.

Coach of the United States Delegation to the European Girls' Math Olympiad Summers 2012-2017.

Coach of the Puerto Rico Delegation to the Iberoamerican Math Olympiad, Fall 2015.

Instructor at US Math Olympiad Summer Program, Summers 2012, 2014, 2015.

Instructor at Brazil Math Olympiad Program, Summer 2012.

Coach of the United States Delegation to the China Girls' Math Olympiad, Summer 2010, 2011

Advising/Advisory Committees

Timothy Bates (2023) (I was the advisor for Bates's Masters thesis)

Zhenyu Huang (PhD advisory committee member, 2024-current)

Ryu Toyoda (PhD advisory committee member, 2022-current)

Other workshops and conferences attended:

BIRS Workshop for Women in Operator Algebras III, Banff, Alberta, Canada, June 2023.

MIT Foams and Instantons Conference, MIT, May 2023 (Invited.)

Frontiers in Geometry and Topology Research Conference, Trieste, August 2022.

Interactions of gauge theory with contact and symplectic topology in dimensions 3 and 4, BIRS, June 2020 (Invited).

Women in Symplectic and Contact Geometry and Topology workshop (WiSCon), July 2019.

PCMI Quantum Field Theory and Manifold Invariants Research Program, July 2019.

Symplectic geometry conference celebrating Simon Donaldson, Cambridge, UK, August 2017.

Georgia International Topology Conference, Athens, Georgia, May 2017

Hamilton Workshop, Dublin, Ireland, August 2016.

Summer School on Moduli Problems in Symplectic Geometry, IHES, France, July 2015.

Graduate Student Topology and Geometry Conference, UIUC, IL, March 2015.

Graduate Workshop on Four Manifolds at Simons Center for Geometry and Physics, Stony Brook, NY, August 2014

Workshop in non-commutative geometry at the Shanghai Center for Mathematical Sciences, Summer 2013.