

Curriculum Vitae of You Qi

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RESEARCH INTERESTS Categorification, representation theory, algebraic geometry, homological algebra, applications to low dimensional topology.

CURRENT POSITION **Assistant Professor**, University of Virginia.
August 2019 – present.

PAST EMPLOYMENT **Sherman Fairchild Research Assistant Professor**, California Institute of Technology.
July 2017 – August 2019.

Gibbs Assistant Professor, Yale University.
July 2014 – June 2017.

Morrey Visiting Assistant Professor, University of California, Berkeley.
July 2013 – June 2014.

EDUCATION **Columbia University**, New York, USA
PhD in Mathematics, Sept 2008 – May 2013.
• Advisor: Mikhail Khovanov
• Thesis: “Hopfological algebra”
Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong
MPhil. in Mathematics, Sept 2006 - July 2008.
• Advisor: Guowu Meng
• Thesis: “An Algebraic Proof of a Quadratic Relation in MICZ-Kepler Problem”
Tsinghua University, Beijing, P. R. China
BS., Academic Talent Program, Sept 2002 – July 2006.

PUBLICATIONS AND ACCEPTED PAPERS [1] Hopfological algebra, *Compositio Mathematica* **150**(01): 1–45, 2014. arXiv:1205.1814.
[2] An approach to categorification of some small quantum groups, joint with Mikhail Khovanov, *Quantum Topology* **6**(2): 185–311, 2015. arXiv:1208.0616.
[3] An approach to categorification of some small quantum groups II, joint with Ben Elias, *Advances in Mathematics* **288**: 81–151, 2016. arXiv:1302.5478.
[4] A categorification of the Burau representation at a prime root of unity, joint with Joshua Sussan, *Selecta Mathematica* **22**(3): 1157–1193, 2016. arXiv:1312.7692.
[5] A categorification of quantum $\mathfrak{sl}(2)$ at prime roots of unity, joint with Ben Elias, *Advances in Mathematics* **299**: 863–930, 2016. arXiv:1503.05114.
[6] The differential graded odd nilHecke algebra, joint with Alexander P. Ellis, *Communications in Mathematical Physics*, **344**(1): 275–331, 2016. arXiv:1504.01712.

- [7] Categorification at prime roots of unity and hopfological finiteness, joint with Joshua Sussan, *Categorification and Higher Representation Theory, AMS Contemporary Mathematics*, **683**: 261–286, 2017. arXiv:1509.00438.
- [8] The center of small quantum groups I: the principal block in type A, joint with Anna Lachowska, *International Mathematics Research Notices IMRN*, **2018**(20): 6349–6405, 2018. arXiv:1604.07380.
- [9] A categorification of a quantum Frobenius map, *Journal of the Institute of Mathematics of Jussieu*, 2017, DOI:10.1017/S1474748017000275. arXiv:1607.02117.
- [10] The center of small quantum groups II: singular blocks, joint with Anna Lachowska, the *Proceedings of the London Mathematical Society*, **118**(3):513–544, 2019. arXiv:1703.02457.
- [11] Morphism spaces in stable categories of Frobenius algebras, *Communications in Algebra*, **47**(8): 3239–3249, 2019. arXiv:1801.07838.
- [12] A faithful braid group action on the stable category of tricomplexes, joint with Mikhail Khovanov, *SIGMA* **16** (2020), 019, 32 pages, arXiv:1911.02503.
- [13] Evaluating thin flat surfaces, joint with Mikhail Khovanov and Lev Rozansky, *Communications in Mathematical Physics*, **385**:1835–1870, 2021. arXiv:2009.01384.
- [14] Remarks on the derived center of small quantum groups, joint with Anna Lachowska, *Selecta Mathematica*, 27, Article Number 68, 40 pages, 2021. arXiv:1912.08783.
- [15] p -DG cyclotomic nilHecke algebras, joint with Mikhail Khovanov and Joshua Sussan, 71 pp. 2017, accepted by the *Memoirs of the AMS*. arXiv:1711.07159.
- [16] A categorification of cyclotomic integers, joint with Robert Laugwitz, 29 pp., 2018, accepted by *Quantum Topology*. arXiv:1804.01478.
- [17] p -DG cyclotomic nilHecke algebras II, joint with Joshua Sussan, 80 pp., 2018, accepted by the *Memoirs of the AMS*. arXiv:1811.04372.
- [18] A braid group action on a p -DG homotopy category, joint with Joshua Sussan and Yasuyoshi Yonezawa, *Journal of Algebra*, **598**, 15 May 2022, pp 470–517. arXiv:2012.15181.

BOOK CHAPTERS [1] Connections to Link Invariants, joint with Johannes Flake, (2020). In *Introduction to Soergel bimodules*, edited by Ben Elias, Shotaro Makisumi, Ulrich Thiel and Geordie Williamson. RSME Springer Series **5**:421–440, Springer, Cham.

PREPRINTS [1] Categorifying Hecke algebras at prime roots of unity, part I, joint with Ben Elias, 44 pp., 2020, arXiv:2005.03128.
 [2] On some p -differential graded link homologies, joint with Joshua Sussan, 2020, arXiv:2009.06498.
 [3] Actions of $\mathfrak{sl}(2)$ on algebras appearing in categorification, joint with Ben Elias, 43 pp., 2021, arXiv:2103.00048.
 [4] On some p -differential graded link homologies II, joint with Joshua Sussan, 26 pp., 2021, arXiv:2108.10722.
 [5] A categorification of the colored Jones polynomial at a prime root of unity, joint with Louis-Hadrien Robert, Joshua Sussan and Emmanuel Wagner, 72 pp., 2021. arXiv:2111.13195.

PROJECTS IN PROGRESS [1] A categorification of the colored Jones polynomial at a prime root of unity, joint with Louis-Hadrien Robert, Joshua Sussan and Emmanuel Wagner, in preparation.
 [2] A categorification of type- A Hecke algebra at prime roots of unity, part II, joint with Ben Elias and Peter McNamara, in preparation.
 [3] Hopfological quotients of hopfological categories, in preparation.

AWARDS AND GRANTS • Collaboration Grants for Mathematicians, Simons Foundation, 2022–2028.
 • NSF Conference Grant “Categorical Methods in Representation Theory and Quantum Topology”, DMS-2204700, 2022–2023.
 • NSF Research Grant “Categorification at Roots of Unity,” DMS-1763328, 2017–2021.
 • Carl B. Boyer Memorial Fellowship, Columbia University, 2012–2013.

INVITED
PRESENTATIONS

- (1) A mini-course on categorification at prime roots of unity, QUACKS conference, online meeting due to Covid19, information (lecture videos and notes) available at <https://pages.uoregon.edu/belias/QUACKS/index.html>. Aug., 2020.
- (2) A talk on tensor product categorification at prime roots of unity, Columbia Symplectic Geometry, Gauge Theory, and Categorification Seminar, New York, September 2019.
- (3) A 4-lecture series on categorification at prime roots of unity, workshop on quiver Hecke algebra and its applications to topology, Nagoya, Japan, July 2019.
- (4) An invited 45-minute address on categorification at prime roots of unity, the 8th International Congress of Chinese Mathematicians, Beijing, China, June 2019.
- (5) Two lectures on categorification at prime roots of unity, Summer School and Workshop on Categorification of Quantum 3-Manifold Invariants, University of Southern California, Jul., 2018.
- (6) A talk on categorification of cyclotomic rings, Categorification and Higher Representation Theory Conference, Mittag-Leffler Institute, Stockholm, Sweden, Jul., 2018.
- (7) A talk on the center of small quantum groups, Colloquium, CUNY Medgar Evers College, May, 2018.
- (8) A talk on the center of small quantum groups, Lie Theory Seminar, UC Riverside, Apr., 2018.
- (9) A talk on the center of small quantum groups, Winter Young Algebraic Geometer Workshop, Southern University of Science and Technology, Shenzhen, Dec., 2017.
- (10) A talk on categorification at prime roots of unity at Guanghai Forum, Fudan University, Shanghai, Dec., 2017.
- (11) A talk on the center of small quantum groups, Special Session on Recent Advancements in Representation Theory, AMS Sectional Meeting at the State University of New York at Buffalo, Sep. 2017.
- (12) A talk on categorification at prime roots of unity, Lie Groups and Quantum Math Seminar, Rutgers University, New Brunswick, Mar., 2017.
- (13) A colloquium talk on categorification at prime roots of unity, University of California, Santa Cruz, Feb. 2017.
- (14) A colloquium talk on categorification at prime roots of unity, Hong Kong University of Science and Technology, Jan., 2017.
- (15) A talk on Categorification at prime roots of unity, Hausdorff Institute, University of Bonn, Dec., 2016
- (16) A talk on the center of small quantum groups, Algebra Seminar, University of Virginia, Sep., 2016.
- (17) A talk on the center of small quantum groups, Geometric Methods in Representation Theory Seminar, University of North Carolina, Chapel Hill, Sep., 2016.
- (18) Three lectures on categorification at prime roots of unity, Workshop: Categorification, Mathematical Institute, University of Bonn, Germany, May, 2016.
- (19) A talk on categorification of small quantum $\mathfrak{sl}(2)$, Informal Mathematical Physics Seminar, Columbia, Apr., 2016.
- (20) A talk on the center of small quantum groups, Yau Mathematical Sciences Center, Tsinghua University, Sanya, China, Mar., 2016.
- (21) Two talks on categorification at prime roots of unity, Kyoto University and RIMS, Kyoto, Japan, Feb., 2016.
- (22) A talk on categorification at prime roots of unity, a conference on “Geometric and Categorical Representation Theory,” Mooloolaba, Australia, Dec., 2015.

- (23) Five lectures on categorification at prime roots of unity, IMPJ, Paris, France, Nov., 2015.
- (24) A talk on categorification of small quantum groups, Colloquium, CUNY Medgar Evers College, Oct., 2015.
- (25) A talk on “A New Year’s Resolution”, Joint Meeting of AMS-EMS-SPM, Porto, Portugal, Jun., 2015.
- (26) A talk on categorification of small quantum groups given at the algebra seminar at University of Oregon, Mar., 2015.
- (27) A talk on “A New Year’s Resolution,” Spring Eastern AMS Sectional Meeting at Georgetown University, Mar., 2015.
- (28) A talk on categorification of small quantum groups given at the representation theory seminar at CUNY graduate center, Sep., 2014.
- (29) A talk on categorification of small quantum groups given at the CBMS conference at North Carolina State University, Jul., 2014.
- (30) A talk on categorification of small quantum $sl(2)$ given at CRM (Canada), a workshop on “Categorification and geometric representation theory,” Jun., 2014.
- (31) A talk on categorification of small quantum groups given at HKUST (Hong Kong), Mar., 2014.
- (32) A talk on categorification of small quantum groups given at UC Davis, Mar., 2014.
- (33) A talk on categorification of small quantum groups in the workshop “Lie Theory Workshop on Quantum Groups,” Stanford, Feb, 2014.
- (34) A talk on categorification of small quantum groups in the conference “Hecke algebras in number theory and categorification,” Columbia, May, 2013.
- (35) A talk on categorification of small quantum groups, MIT, Oct., 2012.
- (36) A talk on categorification of small quantum groups, Yale, Sep., 2012.
- (37) Two talks on categorification of small quantum groups, USC, Sep., 2012.
- (38) Three lectures on Khovanov homology, Chern Institute, Nankai, China, Jun., 2012.

TEACHING EXPERIENCE

University of Virginia

- Math 8710, Lie Algebras, Spring 2022
- Math 2310, Calculus III, Spring 2022
- Math 8559, Introduction to Categorification, Spring 2021
- Math 8710, Lie Algebras, Fall 2020
- Math 2310, Calculus III, Spring 2020
- Math 4651, Advanced Linear Algebra, Fall 2019

California Institute of Technology

- Math 151b Algebraic and Differential Topology, Winter 2019
- Math 128 Homological Algebra, Winter 2019
- Math 151b Algebraic and Differential Topology, Winter 2018
- Math 191a Introduction to Categorification, Fall 2017

Yale University

- Math 560, Geometric Representation Theory, Spring 2017.
- Math 235, Reflection Groups, Spring 2017.
- Advisor of Andrew Salmon on his undergraduate senior thesis *Topics in Lie Theory*. Summer 2017.
- Math 225 Linear Algebra and Matrix Theory, Fall, 2016.

- Advisor of Alexandros Mousatov on his undergraduate senior thesis *An Introduction to Quantum Invariants*. Fall 2015–Spring 2016.
- Math 225 Linear Algebra and Matrix Theory, Spring, 2016.
- Math 381/501, Modern Algebra II, Spring, 2016.
- Math 225, Linear Algebra and Matrix Theory, Spring, 2016.
- Math 650, Introduction to Categorification, Fall, 2015.
- Math 120, Multivariable Calculus, Spring, 2015.
- Math 225, Linear Algebra and Matrix Theory, Fall, 2014.

University of California, Berkeley

- Math 185, Introduction to Complex Analysis, Spring, 2014.
- Math H1b, Honors Calculus, Fall, 2013.
- Math 113, Introduction to Abstract Algebra, Fall 2013.

CONFERENCES ATTENDED

- (1) Summer School and Workshop on Categorification of Quantum 3-Manifold Invariants, University of Southern California, Jul., 2018.
- (2) Categorification and Higher Representation Theory Conference, Mittag-Leffler Institute, Stockholm, Sweden, Jul., 2018.
- (3) Winter Young Algebraic Geometer Workshop, Southern University of Science and Technology, Shenzhen, Dec., 2017.
- (4) Workshop: Categorification, Mathematical Institute, University of Bonn, Germany, May, 2016.
- (5) Joint AMS-EMS-SPM meeting, Porto, Portugal, Jun. 10–13, 2015.
- (6) A conference on “Representation Theory and Geometry of Symplectic Resolutions,” Boston, USA, May 18–21, 2015.
- (7) Spring Eastern AMS Sectional Meeting at Georgetown University, Washington, DC, USA, Mar. 7–8, 2015.
- (8) CBMS conference on Categorification at North Carolina State University, Raleigh, USA, Jul. 5–10, 2014.
- (9) A workshop on “Categorification and geometric representation theory,” CRM, Montreal, Canada, Jun. 9–13, 2014.
- (10) A workshop on “Yangians and Quantum Loop Algebras,” Austin, USA, May 5–9, 2014.
- (11) A workshop on “Quantum and Affine Schubert Calculus,” University of Oregon, Eugene, USA, Aug. 5–9, 2013.
- (12) A summer school on “Cluster Algebras and Commutative Algebras,” MSRI, Berkeley, USA, Aug. 27–Sep. 7, 2012.
- (13) A workshop on “Categorical Representation Theory,” University of Oregon, Eugene, USA, Aug. 13–17, 2012.
- (14) A workshop on “Super-Symmetry and Invariants,” Chern Institute, Nankai, P. R. China, Jun. 18–24, 2012.
- (15) A workshop on “Cluster Algebras and Lusztig’s Semicanonical Basis,” University of Oregon, Eugene, USA, Jun. 13–17 2011.
- (16) A conference on “Derived categories,” Newton Institute, Cambridge, United Kingdom, Apr. 11–15, 2011.
- (17) An international conference on representation theory, Tokyo, Japan, Aug. 5th–15, 2010.
- (18) A winter school on “Homology Theory of Knots and Links,” MSRI, Berkeley, USA, Jan. 25–29, 2010.

PROFESSIONAL
SERVICES

- Co-organizer with Slava Krushal and Weiqiang Wang on the conference, “Categorical Methods in Representation Theory and Quantum Topology”. Apr 15–17, 2022, Charlottesville, VA.
- Referee for the journals and book series *Compositio Mathematica*, *Selecta Mathematica*, *Quantum Topology*, *Finite Fields and their Applications*, *Algebraic and Geometric Topology*, *Proceedings of the London Mathematical Society*, *Algebra and Representation Theory*, *Journal of Combinatorial Theory, Series A*, *Fundamenta Mathematicae*, *Journal of Combinatorial Algebra*, *Contemporary Mathematics*, *Journal of Knot Theory and Ramifications*, *Advances in Mathematics*, *Journal für die reine und angewandte Mathematik*, *Journal of the London Mathematical Society*.
- Coorganizer with Lei Chen of the “Geometry and Topology Seminar” at Caltech, Fall 2018-Spring 2019.
- Coorganizer with Tom Graber, Daxin Xu and Sasha Yom Din of the “Algebra and Geometry Seminar” at Caltech, Fall 2017-present.
- Coorganizer with Igor Frenkel, Gregg Zuckerman of the “Geometry, Symmetry and Physics Seminar” at Yale, Fall 2014-Spring 2017.
- Coorganizer with Atoshi Chowdhury of the UC Berkeley “Representation Theory, Geometry and Combinatorics Seminar”, Fall 2013-Spring 2014.
- Coorganizer with Mikhail Khovanov and Alexander Ellis of the informal categorification and representation theory seminar, 2011-present.
- Discussion session leader, homology theory of knots and links, MSRI, Berkeley, 2010.
- Coorganizer with A. Johan de Jong of the summer graduate student seminar on intersection theory and Grothendieck-Riemann-Roch theorem.

LANGUAGES

- Native Language: (Chinese) Mandarin.
- Foreign Languages: English, French.