JIN-CHENG GUU

jin-cheng.guu@stonybrook.edu | jcguu95.github.io

EDUCATION

- **PH.D. in Mathematics (GPA: 3.96),** Stony Brook University, Aug 2017 - May 2023
- **B.S. in Mathematics (GPA: 3.91, Honors),** National Taiwan University (Ranked 1st in Taiwan), Sep 2013 - Jan 2017

PUBLICATIONS & PREPRINTS

- *Equivalence of field theories: Crane-Yetter and the shadow*, arXiv:2206.04570.
- *Explicit factorization of categorical centers*, arXiv:2111.06919, submitted to *Communications in Mathematical Physics*.
- *Categorical center of higher genera and 4D factorization homology*, arXiv:2107.05914, submitted to *Quantum Topology*.

PROFESSIONAL ACTIVITIES

Speaker

Research

- *Higher Invariants of Manifolds*, Graduate Students Recital at Stony Brook University, May 05, 2022.
- *Categorical Center of Higher Genera and 4D Factorization Homology*, Session on Skein Theory and Quantum Algebra at the Joint Mathematics Meetings, Apr 07, 2022.
- *TQFT and invariants of manifolds and algebras*, Quantum Topology Seminar at Indiana University Bloomington, Mar 28, 2022.
- *Topological Quantum Field Theories from Tensor Categories*, The New York City Category Theory Seminar, Mar 16, 2022.
- *(Higher) Category-valued Manifold Invariants*, Quantum Algebra & Topology Seminar at UC Santa Barbara, Dec 01, 2021.
- *Triangulation and Quantum Invariant*, Algebra Seminar, University of Kansas, Nov 23, 2021.
- *Crane-Yetter model in dimension* 2, Foam Evaluation Research Conference at ICERM, Brown University, Nov 06, 2021.
- *Jones polynomials and their 4D generalization*, Low Dimensional Topology and Gauge Theory Seminar at Stony Brook University, Sep 16, 2021.
- *Integrating categories over surfaces*, Remote Rendezvous for Quantum Topologists (online), Aug 09, 2021.
- *Higher Invariants*, Graduate Student Seminar at Stony Brook University, Mar 12, 2021.

General

- *Internal Skein Algebra*, Learning Seminar on the Finiteness Conjecture of Skein Modules, Nov 10, 2021.
- *Harish-Chandra Modules*, Learning Seminar on the Finiteness Conjecture of Skein Modules, Oct 27, 2021.
- *Kazhdan-Lusztig category II*, https://www.ias.edu/math/events/quantum-groups-seminar-13, IAS Online Seminar: Quantum Groups (organized by Roman Bezrukavnikov (IAS/MIT), Pavel Etingof (MIT) Ivan Losev (IAS/Yale)), May 06, 2021.
- *Serre Spectral Sequences*, Simplicial Study Group (organized by Jin-Cheng Guu), Apr 28, 2021.
- *Kazhdan-Lusztig category I*, IAS Online Seminar: Quantum Groups (organized by Roman Bezrukavnikov (IAS/MIT), Pavel Etingof (MIT) Ivan Losev (IAS/Yale)), Apr 22, 2021.
- *Quantum Schur-Weyl Duality*, Cherednik Algebras and Applications Learning Seminar (organized by Sam DeHority), Mar 31, 2021.
- *Introduction to simplicial sets*, Simplicial Study Group (organized by Jin-Cheng Guu) Mar 24, 2021.
- *Higher Invariants*, Graduate Student Seminar at Stony Brook University, Mar 12, 2021.
- *Koszul Duality and Kazhdan-Lusztig conjecture*, Modern Techniques in Representation Theory (organized by Cailan Li, Henry Liu, Mrudul Thatte), Mar 05, 2021.
- *Pictorial presentation of 2-categories*, Modern Techniques in Representation Theory (organized by Cailan Li, Henry Liu, Mrudul Thatte), Jan 29, 2021.
- *Representation of affine Hecke algebra and the decomposition theorem*, Student Geometric Representation Seminar (organized by Jee Uhn Kim), Jan 13, 2021.
- *Geometric Construction of the Weyl Group*, Student Geometric Representation Seminar (organized by Jee Uhn Kim), Dec 30, 2020.
- *The Kazhdan-Lusztig Conjecture*, Category $\mathcal{O}$ Learning Seminar (organized by Cailan Li, Henry Liu, Mrudul Thatte), Oct 09, 2020.
- *Projectives in category $\mathcal{O}$*, Category $\mathcal{O}$ Learning Seminar (organized by Cailan Li, Henry Liu, Mrudul Thatte), Aug 21, 2020.
- *Feynman Diagrams*, QFT for mathematicians seminar (organized by Dmitry Vaintrob), Jul 23, 2020.
- *Feynman Diagrams*, QFT seminar at CUNY (organized by Mahmoud Zeinalian), Oct 24, 2019.
- *Weyl Character Formula*, Seminar on representation of compact Lie groups (organized by Jin-Cheng Guu), Nov 11, 2018.
- *Fourier Analysis and Representation Theory*, Seminar on representation of compact Lie groups (organized by Jin-Cheng Guu), Oct 18, 2018.
- *Minimal surfaces in $\mathbb{R}^3$*, Analysis Student Seminar (organized by Silvia Ghinassi), Dec 6, 2017.

- *Simplicial Study Group*, Spring, 2021.
- *Representations of compact Lie groups*, Fall, 2018.
- *Student Seminar on Differential Topology*, Summer, 2016.
- *Student Seminar on Real Analysis and Measure Theory*, Summer, 2015.

Participant

- *Quantum Topology and Geometry*, a conference in honor of Vladimir Turaev, Paris, June 13-17, 2022.
- *Global Categorical Symmetries*, Perimeter Institute for Theoretical Physics, June 6-10, 2022.
- *From Representation Theory to Mathematical Physics and Back*, Simons Center of Geometry and Physics, May 31-June 4, 2022.
- *Chern-Simons and Other Topological Field Theories*, Workshop at MSRI, Nov 16-18, 2021.
- *Foam Evaluation*, Workshop at ICERM, Nov 5-7, 2021.
- *International Summer School of Mathematical Physics*, Skoltech (Moscow), July 1-12, 2019.
- *Representations of Finite and Algebraic Groups*, MSRI, Apr 9-13, 2018.

TEACHING

Instructor at Stony Brook University
- *Fundamental Concepts of Math*, Summer 2022.
- *Calculus IV with Applications (Multivariate Differential Equations and Linear Algebra)* with 94% positive student response rate on clarity, effectiveness, usefulness, and promptness. Summer 2021.
- *Fundamental Concepts of Math*, Summer 2020.
- *Mathematical Thinking*, Summer 2019.
- *Proficiency Algebra*, Summer 2018.

Teaching Assistant at Stony Brook University
- *Overview of Calculus*, Fall 2021.
- *Calculus A*, Fall 2021.
- *Applied Algebra*, Spring 2020.
- *Calculus A*, Fall 2019.
- *Advanced Linear Algebra*, Spring 2019.
- *Calculus B*, Fall 2018.

Math Summer Camp for High School Students at Stony Brook University
- *Recurrence and rational equations*, 2020.
- *Counting patterns*, 2019.
- *The Idea of Recurrence*, 2018.

AWARDS

National Taiwan University
- Academic Excellence Awards, 2016.
- Zheng-Tang Xiao Mathematics Scholarship, 2016.
- Zhang, Yang Mathematics Scholarship, 2015.
- Da-Kai Hu Mathematics Scholarship, 2014.
- Academic Excellence Awards, 2014.
- Academic Excellence Awards, 2013.

OTHER EXPERIENCE

- **Computer Science.** Server Maintainer for Math Dept. at Stony Brook University, Nov. 2021 - May 2022.
- **Biology (Research).** Tsinghua University (Ranked 2nd in Taiwan), 2011 - 2012
  Conducted scientific research in biology, created models for cuttlefish bones, tested their strength against robotic forces, led data analysis, and showed relation between the bone structure and its strength. Presented our result at the *Congress of Animal Behaviour and Ecology in Taiwan* titled *The architecture of cuttlefish bones and its compressive strength*.
- **Engineering.** *1*st place, Robotic Soccer Competition, RoboCup Junior Taiwan, 2009
- **Writing.** *Selection Award*, Science Writing Competition Ministry of Science and Technology, 2012