Shintaro Fushida-Hardy

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https://sfushidahardy.github.io

Research Interests

I research geometric topology, mixing tools from symplectic geometry and trisections. I am particularly interested in smooth and geometric surfaces embedded in four-dimensional spaces.

Professional Positions

2025–Present	**Postdoctoral Scholar, University of Waterloo** Mentored by Doug Park

Education

2019–2025	**Ph.D. in Mathematics, Stanford University** Dissertation: "Pseudo-Trisections of 4-Manifolds with Boundary" Advised by Ciprian Manolescu
2018	**B.Sc. (Hons.) in Mathematics, University of Auckland** Dissertation: "Asymptotic Curvature of Hypersurfaces in Minkowski Space" Advised by A. Rod Gover
2015–2018	**B.Sc. in Mathematics and Physics, University of Auckland**

Mathematics Research

[3] Joint with Robert Harris and Doug Park. Untitled research concerning the existence of exotic symplectic structures. In progress.

[2] Joint with Laura Wakelin and Devashi Gulati. *Constructions of Lagrangian Surfaces in Toric 4-Manifolds.* Preparing for publication, expected mid 2026.

[1] *Pseudo-trisections of 4-manifolds with boundary.* https://arxiv.org/abs/2401.09599 Canadian Journal of Mathematics. In press.

Other Refereed Publications

[3] Joint with Peter Huxford. *A Modular Sculpture Corresponding to Three Rotations.* Bridges Conference Proceedings, Aug. 2024, pp. 511-514.

[2] Joint with Pranav Nuti and Megan Selbach-Allen. *Linear algebra activities designed for student engagement.* PRIMUS, 34(4), Feb. 2024, pp. 413–427.

[1] *Crocheting an Isomorphism between the Automorphism Groups of the Klein Quartic and Fano Plane* Bridges Conference Proceedings, Aug. 2021, pp. 327-330.

Awards and Fellowships

2021–2025	**Edward and Sara Roos Graduate Fellowship**, Stanford University Awarded to some graduate students who are also passionate about teaching
2023	**Centennial Teaching Award**, Stanford University Awarded to "outstanding teaching assistants (TAs) for their tremendous service and dedication in providing excellent classroom instruction".
2018	**Collins Prize in Mathematics and Statistics**, University of Auckland Awarded annually to the student with the best overall result for a Bachelor with Honours in mathematics or statistics.
2018	**Senior Scholar Award**, University of Auckland Awarded to the students with the highest overall grades in their major.
2014	**Premier Award**, New Zealand Qualifications Authority Awarded to students who obtained the top 5-10 highest overall results in the New Zealand Scholarship examinations.

Invited Talks

Nov. 2025	*A Squeezable Lagrangian in $S^2 \times S^2$,* University of Waterloo
Nov. 2025	*A Squeezable Lagrangian in $S^2 \times S^2$,* McMaster University
Oct. 2025	*A Squeezable Lagrangian in $S^2 \times S^2$,* Ontario Topology Seminar
Sep. 2025	*A Squeezable Lagrangian in $S^2 \times S^2$,* University of Texas at Austin
May 2025	*Diagrams of Lagrangians from a Trisected Perspective,* AMS Sectional, CalPoly
Dec. 2024	*Pseudo-trisections…* Joint meeting of the NZMS, AustMS and AMS
Nov. 2024	*Pseudo-trisections and Beyond,* University of Virginia
Dec. 2023	*Pseudo-trisections and their diagrams,* Stanford University
Nov. 2023	*Quilts, chains, wooden blocks, and crochet,* University of San Francisco
May 2023	*Pseudo-trisections and their diagrams,* UC Davis
Sep. 2022	*A combinatorial approach to studying Lagrangians in 4-manifolds,* University of Auckland

Selected Conference Participation

Oct. 2025	Ontario Topology Seminar, University of Western Ontario
May 2025	Links in Dimensions 3 and 4, ICERM
May 2025	AMS Western Sectional, CalPoly
Mar. 2025	Simons Collaboration on New Structures in Low-Dimensional Topology Simons Center, New York
Dec. 2024	Joint meeting of the NZMS, AustMS and AMS, Auckland
Aug. 2024	Bridges 2024, Virginia Commonwealth University
Jun. 2024	Summer Trisectors Workshop, University of Nebraska Lincoln
May 2024	Georgia Topology Conference, University of Georgia
Jul. 2023	Gauge Theory and Topology: in Celebration of Peter Kronheimer's 60th Birthday, University of Oxford
Mar. 2023	Simons Collaboration on New Structures in Low-Dimensional Topology Simons Center, New York
Nov. 2022	Topology in Dimension 4.5, Banff International Research Station
Jul. 2022	Topology Students Workshop, Georgia Institute of Technology
Jul. 2022	Summer Trisectors Workshop, Western Washington University
Jun. 2022	New Developments in 4 Dimensions, University of Victoria
Jun. 2021	Summer Trisectors Workshop, Virtual
Apr. 2021	Graduate Student Topology and Geometry Conference, Virtual

Teaching

2025–Present	**Instructor**, Department of Mathematics, University of Waterloo Designed and taught Math 228 *Differential Equations for Physics and Chemistry*. Taught Math 136 *Honours Linear Algebra*.
2019–2025	**Teaching Assistant**, Department of Mathematics, Stanford University Conducted sections, office hours, grading, exam review sessions and occasional substitute lectures for 13 courses. TAed the following courses (with some repeats): Math 20, Math 21, Math 51, Math 61CM, Math 115, Math 117, Math 120, Math 144, Math 171.
2023	**Instructor**, Department of Mathematics, Stanford University Designed and taught Math 75SI *Learn To Give A Math Talk* from scratch. Overwhelmingly positive student feedback can be shared upon request.
2020–2022	**Instructor**, Stanford Summer Engineering Academy, Stanford University Designed and taught a 4-week linear algebra class for incoming students of mostly first generation and low income backgrounds. Focus on inquiry based learning, group work, and mathematical reading.
2021, 2022	**Guest Lecturer**, Department of Biology, Stanford University Taught topological data analysis in Bio 114.
2022–Present	**Shop Monitor**, Department of Art and Art History, Stanford University Teach art students how to safely use shop tools (such as table saws and welders).
2016–2019	**Teaching Assistant**, Department of Mathematics, University of Auckland Conducted tutorials (sections) and grading for eight courses.

Service

2022–2023	Organizer of the Stanford Student Topology Seminar
2020–2022	Organizer of the Stanford KIDDIE colloquium
2020–2025	**Directed Reading Program Mentor**, Stanford University Typically mentor one student each quarter in a reading project
2022–2025	**TA Mentor**, Stanford University Mentor some students who are TAing for the first time each year.
2020–2025	**Peer Mentor**, Stanford University Mentor a new graduate student in the Department of Mathematics each year.
2024	**EDGE Mentor**, Stanford University Mentoring a new graduate student from an underrepresented background.
2023, 2024	Veteran TA Panel, Stanford University Took part in panels to help new TAs in the department.
2022–2025	SUMO Speaker Series, Stanford University Presented exciting/interactive talks to undergraduate mathematics students on three occasions.

References

Professor Ciprian Manolescu
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Stanford University
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