Alex Takeda

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Employment

2023- **Postdoc**, *Uppsala University*, Uppsala, Sweden

2020-2023 **Postdoc**, *Institut des Hautes Études Scientifiques*, Bures-sur-Yvette, France

2019 **Postdoc**, 4-month stay at the *Mathematical Sciences Research Institute* (currently *Simons Laufer Mathematical Sciences Institute*), Berkeley, CA, USA

Education

2013-2019 **PhD in Physics**, *University of California, Berkeley*, Berkeley, CA, USA
Titled "Developments in the mathematics of the A-model: constructing Calabi-Yau structures and stability conditions on target categories".
under the supervision of Vivek Shende, UC Berkeley Mathematics Department, and Mina Aganagic, UC Berkeley Physics and Mathematics Departments.

2017 **MA in Physics**, *University of California, Berkeley*, Berkeley, CA, USA

2009-2013 **BSc in Physics** *California Institute of Technology*, Pasadena, CA, USA

Research

Publications

Manuel Rivera and Alex Takeda, "String topology via the coHochschild complex and local intersections" (2025). To appear in *Journal of the London Mathematical Society*. Available at arXiv:2508.15684.

Vivek Shende and Alex Takeda, "Calabi-Yau structures on topological Fukaya categories". *Compositio Mathematica* **161**, 5 (2025): 1128–1214. DOI:10.1112/S0010437X25007109.

Maxim Kontsevich, Alex Takeda, and Yiannis Vlassopoulos, "Smooth Calabi–Yau structures and the noncommutative Legendre transform". *Journal of Noncommutative Geometry* **19**, 3 (2025), DOI:10.4171/JNCG/614.
Maxim Kontsevich, Alex Takeda, and Yiannis Vlassopoulos, "Pre-Calabi–Yau algebras and topological quantum field theories" *European Journal of Mathematics* **11**, 15 (2025). DOI:10.1007/s40879-024-00802-9.

Alex Takeda, "Relative stability conditions on Fukaya categories of surfaces", *Mathematische Zeitschrift* **301**, 3019–3070 (2022). DOI:10.1007/s00209-022-03007-6.

Alex Takeda, "Introduction to differential graded categories", contribution to *Superschool on Derived Categories and D-branes*, Springer proceedings in Mathematics & Statistics **240**. DOI:10.1007/978-3-319-91626-2.

Preprints

Alex Takeda, "Koszulity of a certain dioperad" (2025). arXiv:2511.02829.

Coline Emprin and Alex Takeda, "Properadic coformality of spheres" (2025). arXiv:2503.04297.

Manuel Rivera, Alex Takeda, and Zhengfang Wang. "Algebraic string topology from the neighborhood of infinity" (2023). arXiv:2308.09684.

Teaching

At Uppsala University, as main instructor:

2026 Algebraic topology, course for Mathematics Master students.

2025 Geometry and Analysis III, course for Physics bachelor students.

2024 Operads and their geometric models, course for Physics and Mathematics PhD students.

At Sorbonne Université, as Chargé de travaux dirigés:

2022 Linear and bilinear algebra, course for bachelor students (L2), in French

At UC Berkeley, as Graduate Student Instructor:

2019 Classical Mechanics (Physics 105, upper division).

2017 Quantum Mechanics (Physics 137A, upper division).

2016 General Relativity (Physics 231, graduate division).

2014 Particle Physics (Physics 129, upper division).

2013 Introduction to Physics (Physics 7/8, lower division).

Recent talks and presentations

may 2026 **Gökova Geometry and Topology conference**, *Non commutative Poincaré duality*, Akyaka, Turkey.

apr 2026 **Manifolds and moduli conference**, *Dioperads, (co)formality and Poincaré duality*, Lisbon, Portugal.

feb 2026 **Homotopy structures in Barcelona conference**, *Properadic aspects of Poincaré duality: Koszulity and formality*, Barcelona, Spain.

jun 2025 **Edinburgh geometry seminar**, *Controlled topology and string operations*, Edinburgh, Scotland.

apr 2025 **IMPA symplectic geometry seminar**, *Algebraic string topology operations and noncommutative Poisson geometry*, Rio de Janeiro, Brazil.

mar 2025 **ETH Mathematical Physics seminar**, *Formality of Y-infinity algebras and operations in string topology*, Zürich, Switzerland.

nov 2024 **Copenhagen Algebra and Topology seminar**, *Categorical coalgebras, homology manifolds and loop co/products*, Copenhagen, Denmark.

oct 2024 **Conference "Uppsala-Odense geometry days"**, *Properadic formality of Poincaré duality structures*, Uppsala, Sweden.

may 2024 **Bonn symplectic geometry seminar**, *Local Poincaré duality, pre-CY structures and the categorical neighborhood of infinity*, Max Planck Institute for Mathematics, Bonn, Germany.

jan 2024 **Séminaire Algèbre et topologie**, *Un nouveau dg-modèle pour l'espace de lacets libres et topologie des cordes*, Université de Strasbourg, France.

aug 2023 **Conference "String topology and connections to BV-quantization, symplectic topology and manifold topology"**, *Pre-CY structures and explicit algebraic analogs of string topology*, Trinity College Dublin, Ireland.

jul 2023 **29th Nordic Congress of Mathematicians**, *Pre-Calabi-Yau structures on the categorical formal neighborhood of infinity and the string coproduct*, Aalborg, Denmark.

dec 2022 **Séminaire Symplectix**, *Smooth Calabi-Yau structures and loop spaces*, Institut Henri Poincaré, Paris, France.

may 2022 **Homotopy in algebraic geometry seminar**, *Géométrie de Poisson non commutative et homologie cyclique négative*, University of Toulouse, France.

mar 2022 **Quantum mathematics research seminar**, *The noncommutative Legendre transform in negative cyclic homology*, Center for Quantum Mathematics, SDU, Odense, Denmark.

mar 2022 **Paris algebra seminar**, *The ribbon quiver complex and the noncommutative Legendre transform*, Institut Henri Poincaré, Paris, France.

sep 2020 **Knots, Strings, Symplectic Geometry and Dualities**, *Introduction to QFT and perturbative Chern-Simons theory*, Mittag-Leffler Institute, Stockholm, Sweden.

Awards and fellowships

2025 Liljewalch travel stipend, for research trip to IMPA, Rio de Janeiro, Brazil.

2022 Financing from *Labex Mathématique Hadamard, Fondation Mathématique Jacques Hadamard*, for the organization of the Workshop on Quantum Geometry at IHES.

2016 Graduate Division Summer Grant at UC Berkeley.

2015 Thelma E. Buchanan Scholarship Fund at UC Berkeley.

2012 Named Richter Memorial Fund Scholarship, for research at CERN.

Organization

2026 Co-organizer of the Math PhD seminar at Uppsala University.

2023-2025 Organizer of the Geometry and Topology seminar series at Uppsala University.

2022 Organize a reading group on integrable systems and quantization at IHES.

2022 Co-organized the Workshop on Quantum Geometry at IHES.

Other skills

Native speaker of Portuguese
Fluent in English and French
Good knowledge of Japanese
Basic knowledge of Swedish

Some experience with Macaulay2, SageMath, Singular, Python, C++.

Citizenship

Brazil
Portugal