

GreysonPotter

Postdoctoral Researcher, Centre for Quantum Mathematics

contact

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programming

Python
Mathematica
Javascript
OCaml
C++
CSS & HTML

interests

Game Design
Web Development
Project Euler
Hiking
Photography

website

gkpotter.com

employment

- since 2023 **Postdoctoral Researcher**, Centre for Quantum Mathematics Odense, Denmark
University of Southern Denmark
- Advisor: Jørgen Ellegaard Andersen
 - Topics: Topological quantum field theory, topological quantum computing, and knot invariants
 - Grants: ERC Synergy Grant “RenewQuantum” and Simons Foundation Collaboration “New Structures in Low-dimensional Topology”
 - Masters Students: Aksel Vendelsøe (Quantum generative adversarial networks)

education

- 2023 **Ph.D. in Mathematics**, Boston University Boston, MA
- Advisor: Takashi Kimura
 - Topics: Topological recursion, quantum Airy structures, knot invariants
- 2020 **M.A. in Mathematics**, Boston University Boston, MA
- Coursework focused on geometry and topology
- 2017 **B.A. in Mathematics**, *magna cum laude*, Columbia University New York, NY
- Minor in Philosophy

research interests

Topological Quantum Computing, Topological Quantum Field Theory, Topological Recursion, Knot Invariants, Complex Geometry, Computational Mathematics, Mathematics Education

research papers

- 2024 **"Quantum algorithms for computing knot invariants"** (in progress)
(Joint with Jørgen Ellegaard Andersen and Konstantin Wernli.)
- 2024 **"An algorithm for computing topological recursion via higher quantum Airy structures"** (in progress)
(Joint with Roderic Guigo Corominas and Takashi Kimura.)
- 2024 **"qairy -- a SageMath package for computing topological recursion via higher quantum Airy structures"** (in progress)
Available at github.com/gkpotter/qairy.
- 2023 **"Topological recursion, quantum Airy structures, and the generalized volume conjecture"**
PhD thesis, Boston University

research talks and posters

2024	"Andersen-Kashaev TQFT and Approximating the Tetrahedral Operator in Photonics Platforms" CLUSTEC General Assembly	Neuchâtel, Switzerland
2023	"Topological Recursion, Higher Quantum Airy Structures, and Knot Invariants" Centre for Quantum Mathematics Research Seminar	Odense, Denmark
2023	"Non-perturbative Topological Recursion and $SL(2, \mathbb{C})$ Chern-Simons Theory" Poster at Richmond Geometry Meeting 2023	Richmond, VA
2023	"Non-perturbative Topological Recursion and $SL(2, \mathbb{C})$ Chern-Simons Theory" New England Algebraic Topology and Mathematical Physics Seminar	Boston, MA
2023	"Hyperbolic Knot Invariants and the Volume Conjecture" BU Community Seminar	Boston, MA
2022	"Non-perturbative Topological Recursion and the Generalized Volume Conjecture" BU Geometry and Physics Seminar	Boston, MA
2022	"Computing Topological Recursion via Higher Quantum Airy Structures" Poster at TR Salento 2022	Otranto, Italy
2022	"Topological Recursion, the Catalan Numbers, and Mirror Symmetry" BU Community Seminar	Boston, MA
2021	"Graph Sums in Topological Recursion" BU Student Geometry Seminar	Boston, MA
2021	"Topological Recursion and Higher Quantum Airy Structures" BU Student Geometry Seminar	Boston, MA
2021	"Introduction to Topological Recursion" BU Student Geometry Seminar	Boston, MA

workshops

since 2023	Simons Foundation Collaboration Meetings Funded to participate in various workshops as part of the Simons Foundation Collaboration "New Structures in Low-Dimensional Topology" in Belalp, Switzerland, Princeton, NJ, and New York, NY.	Various Locations
2021, 2022	TR Salento Funded to participate in the topological recursion two-week summer school and workshop, collaborating with graduate students, postdocs, and professors to study the relationship between topological recursion and integrable systems, cohomological field theories, resurgence, enumeration of maps, and Hurwitz theory.	Otranto, Italy
2021, 2022	BU-Keio-Tsinghua Workshop Participated in the joint workshop between Boston University, Keio University (Yokohama, Japan), and Tsinghua University (Beijing, China), which focused on geometry and mathematical physics.	Boston, MA
2019	MSRI Graduate Summer School Funded to participate in the <i>Representation Stability</i> summer school the Mathematical Sciences Research Institute, collaborating with graduate students, postdocs, and professors to study the algebraic structural properties and stability phenomena exhibited by sequences of representations of groups.	Berkeley, CA
2015–2017	Math Summer Research Program, Columbia University Funded to conduct research in both the <i>Spectral Graph Theory, Markov Chains, and the PageRank Algorithm</i> group and the <i>Constructions and Obstructions of Symplectic Embeddings</i> group.	New York, NY

teaching

since 2023	Lecturer and Course Organizer, University of Southern Denmark <ul style="list-style-type: none">• <i>Advanced Topics in Quantum Mathematics</i> (Fall 2023)	Odense, Denmark
2018–2021	Lecturer, Boston University <ul style="list-style-type: none">• MA 511 <i>Introduction to Real Analysis</i> (Summer 2021)• MA 412 <i>Complex Variables</i> (Summer 2020)• MA 225 <i>Multivariable Calculus</i> (Summer 2018)	Boston, MA
2017–2023	Teaching Assistant, Boston University <ul style="list-style-type: none">• MA 412 <i>Complex Variables</i> (Spring 2022)• MA 226 <i>Differential Equations</i> (Summer 2020)• MA 225 <i>Multivariable Calculus</i> (Fall 2018)• MA 124 <i>Calculus II</i> (Spring 2019, Fall 2019, Spring 2021, Fall 2022)• MA 123 <i>Calculus I</i> (Fall 2021)• MA 122 <i>Calculus II for Social Sciences</i> (Spring 2020)• MA 121 <i>Calculus I for Social Sciences</i> (Spring 2018)• MA 120 <i>Introduction to Applied Math</i> (Fall 2017)• CS 132 <i>Geometric Algorithms</i> (Fall 2020)	Boston, MA
2014–2017	Teaching Assistant, Columbia University <ul style="list-style-type: none">• MATH 2010 <i>Linear Algebra</i> (Fall 2015, Spring 2016)• MATH 1204 <i>Calculus IV</i> (Spring 2015)• MATH 1201 <i>Calculus III</i> (Fall 2014, Fall 2016)• MATH 1102 <i>Calculus II</i> (Spring 2017)	New York, NY

leadership and experience

- since 2023 **Associate, QPurpose** Odense, Denmark
Developing algorithms and software for clients in various industries, including finance and quantum computing. Working in small teams with fellow researchers, software developers, and student programmers. Leveraging techniques from advanced mathematics to develop classical, quantum-inspired, and fully quantum algorithms.
- since 2021 **Counselor, PROMYS Pathways** Boston, MA
Working in small groups with high school students from low-income and underrepresented backgrounds, guiding them through rigorous mathematical problem-solving activities both in an in-person summer day program and throughout the year in virtual meetings.
- 2021–2022 **President, BU Chapter of the American Mathematical Society** Boston, MA
Organized events to promote graduate student research and professional development including: BU Community Seminar, Distinguished Speaker Seminar, Workshops on Ph.D. Research Tools and Website Development, Panels on Summer Teaching and Applying to Jobs and Postdocs.
- 2021–2022 **Organizer, BU Student Geometry Seminar** Boston, MA
Organized semester-long weekly seminar on *Stacks and Moduli* and mini-courses on *Topological Recursion* and *Toric Varieties*.
- 2021 **T² (Teacher's Teacher), PROMYS for Teachers** Boston, MA
Worked in small groups with secondary school teachers in an intensive, exploratory, mathematical problem-solving summer course.
- since 2019 **Mentor, Directed Reading Program, Boston University** Boston, MA
Working one-on-one with an undergraduate student each semester to guide them through an advanced math text and develop and present a talk on what they learned.
- 2014–2017 **Co-founder and Treasurer, CU Game Dev** New York, NY
Co-founded the Columbia University Game Design and Development club, which seeks to make game design more accessible through workshops, speaker events, and game jams.
- 2014 **Math Assessment Intern, New Classrooms** New York, NY
Provided feedback on assessments and worked to ensure that questions accurately assessed specific mathematical concepts (grades 6-8) in student-friendly language.