Srivatsa Tata

sri.tata@yale.edu

www.sritata.com

EDUCATION

PhD Student, Yale University, *New Haven, CT*----------9/2021 – Present

Subjects: 2D Statistical Mechanics, Mathematical Physics

Master's Student, University of Maryland, *College Park, MD*----------1/2019 – 8/2021

Subjects: Mathematical Physics

Coursework includes: Holographic Duality, Solid State Physics, Representation Theory, Manifold Index Theory

BS, Rutgers University, Presidential Scholar, *New Brunswick, NJ*----------9/2014 – 5/2018

Subjects: Mathematics, Physics Major GPA: 3.9 ***Top student in both majors***

- Highest Honors in Math (awarded to 1-2 students annually)
- Numerous awards and scholarships in Physics (see below)

Coursework includes: Differential Geometry, Algebraic Topology, Quantum Field Theory, General Relativity

WORK EXPERIENCE

Research Assistant, *Yale Math Department*----------9/2021 – Present

Advisor, Richard Kenyon. *Statistical Mechanics, Quantum Field Theory,* Investigating the quantum field theoretic aspects of and extensions of the dimer model

Lecturer / Teaching Assistant, *Yale Math Department*----------9/2021 – Present

Lecturer and teaching assistant for math courses, such as multivariable calculus and real analysis

Research Assistant, *UMD Physics Department*----------1/2020 – 8/2021

Advisor, Maissam Barkeshli. C*ondensed Matter Physics, Algebraic Topology, Quantum Field Theory,* Investigating discrete quantum field theories and topological invariants via fusion categories and fermionic and spin TQFTs

Teaching Assistant, *UMD Physics Department*----------1/2019 – 6/2021

Teaching assistant for Introductory Physics courses, such as Electromagnetism, Classical Mechanics, etc

Research Assistant, *UC Davis Physics REU*----------Summer 2017

Advisor, Mukund Rangamani. Investigating perturbative calculations of Out-of-Time-Order Correlators.

Grader, *Rutgers Physics Department*----------Spring 2017

Grader for Intermediate Quantum Mechanics 417

Research Assistant, *Rutgers Physics Department* ----------6/2015 – 3/2017

Assistant for high energy experimental particle physics research at CMS at the LHC, searching for exotic decay models with signatures of jets significantly displaced from the beamline. Responsibilities include development of analysis tools and analysis, organization, and presentation of data

Peer Tutor, *Rutgers SAS Honors Program*----------2/2015 – 5/2016

Weekly volunteer tutoring in subjects including Intro to Computer Science, Calculus, and General Physics

Part Time Lecturer, *Rutgers Physics Department* ----------Spring 2015

Teaching Assistant and Lab Instructor for PHYS 230, Analytical Physics II. Providing instruction, creating assessments, and assisting students in a lab-based course covering various topics in modern physics

SKILLS

Python, Java, C++, Shell-Scripting, ROOT, LaTeX, Mathematica. Adobe Illustrator, AutoCAD

Coursera certification in "Machine Learning Specialization" by Andrew Ng

Proficient in Spanish, French

ACADEMIC PUBLICATIONS

"A quantum N-dimer model"

About a quantum deformation of the higher rank dimer model https://arxiv.org/abs/2510.07543. Joint with D. Douglas, N. Ovenhouse, R. Kenyon, S. Panitch (in submission)

"Rank-N Dimer Models on Surfaces"

Generalizing the Rank-N dimer model to surfaces https://arxiv.org/abs/2408.12066 (in submission)

"2D Fermions and Statistical Mechanics: Critical Dimers and Dirac Fermions in a Background Gauge Field"

Comparing critical dimer models with the Dirac fermion in background gauge fields. https://arxiv.org/abs/2208.10640 (in submission)

"Higher Cup Products on Hypercubic Lattices: Application to Lattice Models of Topological Phases"

About defining cup-i products on a hypercubic lattice and applying them to well-known Hamiltonian lattice models of topological phases of matter. Joint with Y.A. Chen Journal of Mathematical Physics 64, 091902 (2023)

"Anomalies in (2+1)D Fermionic Topological Phases and (3+1)D Path Integral State Sums"

About combinatorial 4-manifold invariants depending on a gauge field and background spin structure, corresponding physically to 'fermion condensation'. Joint with R. Kobayashi, D. Bulmash, M. Barkeshli Communications in Mathematical Physics 397, 199-336 (2023)

"Geometrically Interpreting Higher Cup Products and Application to Combinatorial Pin Structures"

About geometrically interpreting the cup-i products of Steenrod and defining Pin structures on triangulated manifolds (which has applications to spin TQFTs). https://arxiv.org/abs/2008.10170

AWARDS

Robert L. Sells Scholarship----------4/2017

Awarded to two or three Rutgers physics majors who have demonstrated outstanding academic excellence

Phi Beta Kappa Honor Society----------4/2017

Maurice M. and Adrienne R. Weill Scholar----------8/2016

Award from Rutgers math department in recognition of exemplary academic record

Herman Y. Carr Scholarship----------4/2016

Awarded to two or three Rutgers physics majors who have demonstrated outstanding academic excellence

David Martin Weiss Memorial Award----------8/2015

Awarded to a first-year student at Rutgers who has done exceptional work in mathematics

Rutgers Undergraduate Prize Exam, Notable Performance----------4/2015

Notable performance on annual Freshman-Sophomore math prize examination

TALKS

Condensed Matter Theory Seminar---------- UCLA, 4/2024

Geometry, Statistical Mechanics, and Integrability Seminar Series---------- IPAM, 4/2024

Dimers: Combinatorics, Representation Theory and Physics---------- CUNY, 8/2023

Titled "2D Dirac Fermions from Dimers", based on 2208.10640

ACTIVITIES

Yale Student UFO Society, *2023-Present*

Lead organizer in a student group on UFOs / UAP. Organizing lectures by officials, academics, and figures regarding the Congressional UAP movement, civilian scientific analysis, and ramifications of the UFO phenomenon

Program Participant, *Institute for Pure & Applied Mathematics at UCLA, 2024*

Active participant of Long Program at IPAM about Geometry, Statistical Mechanics, and Integrability

Directed Reading Program, *Yale Math Department, 2022-2023*

Guide math undergrads in various topics, including geometry and mathematical physics

Math RIT on Geometry and Topology, *UMD Math Department*

Active Participant in Math Department's Geometry and Topology Reading Group, whose topic during the 2019-2020 school year was "SPT Phases and Invertible TQFT's". I gave a set of talks on the 'The Dimer Model and 2D Fermions: combinatorics from Spin TQFTs to Bosonization', available at http://www2.math.umd.edu/~jmr/DimerModel.pdf

Saalburg Summer School, *W.E. Hereaus Foundation, 9/2018*

Attended Saalburg Summer School, "Methods in Theoretical Physics"

Independent Study, *Rutgers Physics Department, Senior Year*

Advisor, Tom Banks. Independent Study in black hole information theory and holography

Directed Reading Program, *Rutgers Math Department, Fall 2016*

Independent Study in differential geometry; differential forms and classical gauge theories