

## Srivatsa Tata

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+1-973-294-4476

### 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. *Condensed 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