Ryan Marin

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EDUCATION

Princeton University, *Physics, A.B.* 2021 – 2025
- **GPA**: *3.7* Princeton, NJ
- **Awards**: *Manfred Pyka Memorial Physics Prize* (*x2*): given to outstanding Physics undergraduates for excellence in course work (*2022, 2023*)

Relevant Coursework:
- **Undergrad**: Statistical Mechanics, Quantum Theory, Adv. Electrodynamics, Experimental Physics, Stochastic Processes, Differential Geometry, Complex Analysis, Algebraic Geometry
- **Graduate**: Quantum Field Theory, String Theory, Black Holes & High Energy Gauge Theories, General Relativity, Algebraic Topology

San Juan Hills High School, *General Studies, Valedictorian* 2017 – 2021
- **GPA/ACT/SAT:** 4.000/4.924, 36/36, 1580/1600 San Juan Capistrano,
- **Awards**: *U.S. Physics Olympiad Semifinalist* (2020)*, National AP Scholar* (2021) CA

RESEARCH

Nonfactorization in AdS_2 Quantum Gravity, *Senior Thesis* 2024 – 2025
- Wrote 127 page review of modern advances in low-dimensional quantum gravity, JT gravity and its adaptation as a coset-model SL(2,R) BF theory, interpreting the Saad-Shenker-Stanford ensemble model and its connections to modern complexity theory. Princeton, NJ
- Mentored by **Juan Maldacena**, *Carl P. Feinberg Professor,* Institute for Advanced Study

C^k-regular extremal black holes in maximally-symmetric spacetime and the third law of black hole thermodynamics, *Undergraduate Research, Junior Paper* 2023 – 2024
- Adapted Kehle–Unger "null-cone gluing" to curved spacetime, proving the first construction of extremal Reissner–Nordström black holes from smooth Cauchy data, providing a counter-example and analysis to the classical “third law’’ of black-hole thermodynamics in dS_4/AdS_4 Princeton, NJ
- Written under guidance of Mihalis Dafermos, *Professor*, Princeton department of Mathematics, preprint published on Arxiv/2411.17938

Toward a resolution of the black hole information paradox: the quasi-analytic transition between self-gravitating strings and black holes, *Undergraduate Research, Junior Paper* 2024
- Literature review of self-gravitating string solutions within M-theory landscape Princeton, NJ
- Interpreted Witten-Maldacena-Chen entropy methods and Horowitz-Polchinski mechanism
- Written under Nissan Itzhaki, *member,* School of Natural Sciences, Institute for Advanced Study

Myers-Perry 4+1 black holes via superradiance and null geodesic trapping, *Undergraduate Research* 2023
- Researched stability of Myers-Perry black holes within landscape of high-dimensional black hole solutions via PDE modeling of null geodesic trapping and superradiance Mission Viejo, CA
- Mentored by Dr. Gabriele Benomio, *Postdoctoral Fellow*, Princeton University

FINANCE

Jane Street, *Quantitative Trading Intern* 2024
Over the course of 11 weeks, developed two desk projects and attended daily courses on algorithmic trading & mathematical modeling New York City, NY
- **Options:** Developed functional regression techniques to detect structural misalignments in event-driven volatility surfaces
- **Domestic ETFs:** Developed a predictive algorithm to trade on interest rate fluctuations in tax instruments

Tiger Capital Management, *Analyst; Technology (2021), Industrials & Energy (2022)* 2021 – 2023
- Produced company models, DCFs, wrote and pitched stock evaluations Princeton, NJ
- Balanced portfolio for oldest, most competitive (<3%) fund at Princeton (>150k AUM)

MISCELLANEOUS

Technical Skills: Python, Java, LaTeX, Mathematica, MATLAB, Excel, Machining & Soldering
Languages: English [Native], French [C1], Mandarin Chinese [B1], Akkadian [A2]
Interests: Linguistics, Rock Climbing, Jazz, Aviation, Category Theory, Metaphysics