Gustavo Valdivia-Mera

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Education

University of Houston — 2023–Present

Ph.D. in Physics — *GPA: 4.0 (All courses graded A)*

- **Core Curriculum:** Methods of Mathematical Physics, Quantum Mechanics I & II, Advanced Mechanics, Electrodynamics, Statistical Physics
- **Electives:** Quantum Field Theory I & II, General Relativity and Cosmology, Quantum Information, Advanced Statistical Mechanics
- **Fellowships:** Lydia Mendoza Fellowship (2024–2026), Presidential Fellowship (2023–2025)
- **Award:** Winner, 2023 Quantum Computing Fall Fest Competition

Universidad Nacional Mayor de San Marcos — 2019–2020

Professional Degree in Physics — *Grade: 18/20 (Outstanding)*

- *Thesis:* On the subjacent relation to Quantum Entanglement and Wormholes: ER = EPR
- *Advisor:* Prof. Teófilo Vargas
- *Award:* Research Vice-Chancellor's Scholarship

Universidad Nacional Mayor de San Marcos — 2012–2017

B.Sc. in Physics — *Graduated 1^{st} in Class*

- **Advanced Coursework:** Quantum Field Theory, General Relativity, Nuclear Physics
- Achieved perfect 20/20 in semester 2016-2

Research Experience

University of Houston — 2024–Present

Research Assistant

- Quantum field theory in curved spacetime
- Black hole thermodynamics
- Quantum information

Theoretical Physics Group — 2015–2019

Research Member — UNMSM, Lima

- AdS/CFT correspondence
- Black hole thermodynamics

Publications

- (2024) Path integral derivation of the thermofield double state in causal diamonds. *Classical and Quantum Gravity*, 42(2), 025015.
- (2025) On the Unruh effect and the thermofield double state. *International Journal of Modern Physics D*, 34, 2530002-255.
- (2025) Thermal nature of the causal diamond horizon: A hidden property of the inertial propagator. e-Print: 2508.16880 [hep-th].
- (2025) HBAR entropy in causal diamond geometry: A near-horizon perspective. e-Print: 2508.13493 [hep-th].

Presentations and Courses

Conference Presentations

- **Towards HBAR in the causal diamond near horizon**
  IQSE Summer School on Quantum Science, Texas A&M University, Casper, WY *Jul 2025*
- **Path integral derivation of the thermofield double state in causal diamonds**
  APS Global Physics Summit, Anaheim, CA *Mar 2025*
- **Quantum Algorithms I & II**
  Quantum Scholars Program, QuantumQuipu (Online) *Aug 2023*
- **Bounds on eV-scale sterile neutrinos from neutrinoless double-beta decay**
  Summer School on Particle Physics, ICTP, Trieste, Italy *Jun 2023*
- **Numerical simulations of particle orbits in Schwarzschild-like spacetime**
  II Summer School of Computational Physics (Online) *Mar 2021*

Advanced Courses Completed

- **Classical & Quantum Black Holes**
  Physics Latam (Online) *Oct–Nov 2024*

Earlier Presentations

- **ER = EPR: Quantum entanglement and wormholes**
  Physics Week, UNMSM, Lima *Nov 2017*
- **Introduction to the AdS/CFT correspondence**
  XXV Peruvian Symposium of Physics, PUCP, Lima *Oct 2016*
- **QFT in non-inertial reference frames: Unruh effect**
  X Theoretical Physics at the Rimac River, UNI, Lima *Jan 2016*
- **Black hole thermodynamics**
  XXIV Peruvian Symposium of Physics, UNMSM, Lima *Nov 2015*

Teaching Experience

- **University of Houston**
  - Quantum Mechanics (Undergraduate) Fall 2025
  - Quantum Mechanics II (Graduate) Spring 2025
  - Physics Laboratory (Undergraduate) Fall 2023
- **TECSUP, Lima** 2018
  General Physics

Awards and Honors

- **Lydia Mendoza Fellowship** 2024–2026
  University of Houston
- **Presidential Fellowship** 2023–2025
  University of Houston
- **1st Place**, Quantum Computing Fall Fest 2023
  University of Houston
- **Graduated 1st in Class** 2017
  UNMSM
- **Research Scholarship** 2018
  UNMSM Vice-Chancellor's Office

Technical Skills

- **Programming:** Python, Fortran, LaTeX, Mathematica