

Juan Fernández de la Garza

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ACADEMIC SUMMARY

MSc Physics – ETH Zürich (GPA: 5.55/6.0, cohort's mean: 5.42) 09/2021 - 06/2023
BSc Engineering Physics, Honors – Tecnológico de Monterrey (GPA: 98/100, 2nd highest in my cohort) 08/2016 - 06/2021
+ Exchange studies at NTU in Singapore & EPFL in Switzerland. 01/2019 - 08/2020

WORK HISTORY

Data Engineer at ClimateAI 12/2023 - 06/2024
★ Developed a data rechunking app that led to reducing processing time in ML model tests by ~20x.
★ Engineered a module to ensure NaN-free weather data across all of our pipelines.
★ Designed two modules to detect weather forecast anomalies. Developed one for global-wide assessment.
★ Mainly worked with the XArray, Zarr, Fire, Dask, Pandas and Numpy libraries in Python, and AWS Cloud.

Teaching Assistant at ETH Zürich 02/2022 - 12/2022
★ For “Electrodynamics” (undergraduate level) and “Quantum Information Theory” (master’s level).

Teaching Assistant at Tecnológico de Monterrey 08/2018 - 12/2020
★ For “Theory of Electromagnetism”, “Electricity and Magnetism” and “Physics I”.

RECENT PROJECTS

Simulations of Lattice Gauge Theories with GPUs – *High Performance Computational Physics group @ ETH Zürich*
➤ Visiting student 10/2023 - 11/2023
★ Explored alternatives for GPU-CPU unified memory for the QUDA-OpenQ*D interface.

➤ Master’s thesis (graded “very good” 5.5/6.0) 09/2022 - 04/2023
★ Worked on a first QUDA-OpenQ*D API for GPU offloading, written in CUDA C++.
★ Benchmarks with the API achieved a ~100x acceleration (comparing up to 4 CPU cores to 4 GPU cards).

Quantum Information: From Foundations to Algorithms (Master’s proseminar) – *ETH Zürich* 02/2022 - 06/2022
★ Delivered a seminar on quantum simulations of lattice gauge theories. [<slides>](#) [<report>](#)

Partially Coherent Light with Machine Learning [DOI:10.1117/12.2596626](https://doi.org/10.1117/12.2596626) – *Tecnológico de Monterrey* 08/2020 - 06/2021
★ Trained a CNN with Tensorflow to perform modal decompositions of partially coherent Ince-Gaussian beams.
★ Developed a Monte Carlo method in MATLAB to simulate light decoherence.

Legendre-Lorentzian Solitons [DOI:10.1088/2040-8986/abf026](https://doi.org/10.1088/2040-8986/abf026) – *Tecnológico de Monterrey* 08/2020 - 04/2021
★ Derived a new family of soliton solutions in (1+1) dimensions and characterized their stability.
★ Implemented MATLAB scripts for simulating beam propagations in non-linear mediums of (1+1) and (2+1) dimensions.

PROGRAMMING EXPERIENCE

Extensive:	Python	♦	LaTeX	♦	MATLAB						
Intermediate:	C/C++	♦	Git	♦	Mathematica						
Basic:	GNU Make	♦	CUDA	♦	Tensorflow	♦	Pytorch	♦	Qiskit	♦	QuTiP

LANGUAGE SKILLS

Spanish: Native ♦ **English:** C1 (TOEFL iBT 113/120) ♦ **German:** B1/B2 ♦ **French:** B1

AWARDS AND SCHOLARSHIPS

Fulbright-García Robles Scholarship (<i>declined</i>)	07/2022
PLANCKS Physics Competition 2021: 10th place worldwide to “Hijos de Galois” team	07/2021
SPIE Optics and Photonics Education Scholarship	05/2021
Mexican Physics Tournament 2021: 2th place nationwide to “Hijos de Galois” team	02/2021
iGEM 2018 Silver Medal to Tec-Monterrey team	10/2018
Alma Máter Award to the Engineering Physics Student Society 2017-2018	04/2018
Tecnológico de Monterrey Scholarship for Academic Talent	06/2016
Tecnológico de Monterrey International Science Competition 2016: 1 st place in Mathematics	02/2016

WORKSHOPS AND CONFERENCES

Methods of Effective Field Theory and Lattice Field Theory @ Bad Honnef Physics School	07/2023
Zurich Undergraduate Colloquium in Computational Science, Mathematics and Physics @ ETH Zürich → Delivered an introductory talk on quantum physics simulations with computers. <slides> <video>	04/2023
Efficient simulations on GPU hardware @ ETH Zürich	10/2022
SPIE: Laser Beam Shaping XXI → Presented my research project on the decomposition of Ince-Gaussian beams with neural networks.	08/2021
Gulf Coast Undergraduate Research Symposium @ Rice University → Presented preliminary results of my research project on Legendre-Lorentzian solitons. <slides>	10/2020
XV School of Fundamental Physics @ Autonomous University of Querétaro	08/2020
iGEM Giant Jamboree 2018 → Presented the mathematical model and results of our CRISPR-Cas project. <slides>	10/2018
MIT-Tecnológico de Monterrey “NanoLAB” on micro- and nano-fabrication techniques	Summer 2018

EXTRACURRICULAR ACTIVITIES

Student government at Tecnológico de Monterrey

• Director of Finance for the XXII International Physics Symposium (SIF).	07/2020 - 03/2021
• Olympiad Mathematics Coordinator for in-campus social service (JaqueMat).	07/2018 - 12/2018
• Fundraising Coordinator at the Engineering Physics Student Society (SAIFI).	01/2018 - 05/2018