# Juan Fernández de la Garza

juanfernandezdlg@gmail.com ◇ linkedin.com/in/fernandezdlg
github.com/fernandezdlg ◇ juanfernandez.org

## 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 in the plaquette reduction operator (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 – *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 – *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 ◇ GNU/Linux ◇ Mathematica
**Basic**: GNU Make ◇ CUDA ◇ Tensorflow ◇ Pytorch ◇ Qiskit ◇ QuTiP

## LANGUAGE SKILLS

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

## 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

## AWARDS AND SCHOLARSHIPS

**Fulbright-García Robles Scholarship** *(declined)* 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 04/2023
↪ Delivered an introductory talk on quantum physics simulations with computers. <slides> <video>

**Efficient simulations on GPU hardware** @ ETH Zürich 10/2022

**SPIE: Laser Beam Shaping XXI** 08/2021
↪ Presented my research project on the decomposition of Ince-Gaussian beams with neural networks.

**Gulf Coast Undergraduate Research Symposium** @ Rice University 10/2020
↪ Presented preliminary results of my research project on Legendre-Lorentzian solitons. <slides>

**XV School of Fundamental Physics** @ Autonomous University of Querétaro 08/2020

**iGEM Giant Jamboree 2018** 10/2018
↪ Presented the mathematical model and results of our CRISPR-Cas project. <slides>

**MIT–Tecnológico de Monterrey "NanoLAB" on micro- and nano-fabrication techniques** Summer 2018