César Díaz Blanco

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Education

University of Tübingen   **Tübingen, Germany**

M.Sc. in Machine Learning (1.73/1.00)   *since 10/2023*

University of Illinois at Urbana-Champaign   **Urbana-Champaign, USA**

B.Sc. in Engineering Physics (3.94/4.00 GPA) with Highest Honors   *08/2019 – 05/2023*
Minor in Computer Science (4.00/4.00 GPA)
Coursework: Data Structures, Algorithms, Computer Architecture, Systems Programming
Deep Learning, Computational Photography, and Machine Perception

Work Experience

Working Student   **Stuttgart, Germany**

Software Engineer   *since 09/2024*

- Developed interactive visualization scripts with the `vedo` 3D plotting library.
- Prepared the data release of reconstructed scenes by adjusting mesh size.
- Improved code readability by adhering to PEP8 guidelines through `mypy`.

Projects

Single stage object detection on PyTorch using Google Cloud Platform

- Developed a model with a five-part loss which learned bounding box and classification tasks
- Reached 0.5175 mean average precision across 20 classes

Neural network framework from scratch using NumPy

- Implemented backpropagation with support for sigmoid, softmax, ReLU, and linear layers
- Built in several optimizers including Adam, mini-batch SGD, and SGD

Research Experience

IBM-IL Discovery Accelerator Institute   **Urbana, USA**

Qutrit Quantum Systems Researcher   *08/2022 – 05/2023*

- Constructed a Hamiltonian to manipulate a transmon as a qutrit through EM pulses
- Developed Monte Carlo simulations to identify optimal ways to measure multilevel coherence
- Visualized quantum multilevel systems using `Open 3D` and `plotly` on Python.

Computational Astrophysics with Professor Charles F. Gammie   **Urbana, USA**

Student Researcher and Test Developer   *05/2021 – 05/2023*

- Implemented test problems on C/C++ to assess the correct evolution of the fluid's entropy in the group's second-order, conservative simulation parallel code
- Analyzed error convergence of the fluid variables to the analytical solution by calculating its norm across multiple parameters and several timescales

Skills

- Languages: Spanish (Native), English (Fluent), German (Basic)
- Coding: Python (Advanced), C/C++(Intermediate), PyTorch(Intermediate), SQL, Java (beginner)

Presentations

Illinois Scholars Undergraduate Research Expo   **Urbana, USA**

Multilevel Coherence and Manipulation of Transmon Qutrits   *04/2023*

Astronomy Summer Undergraduate Research Symposium   **Urbana, USA**

Electron Heating in the relativistic fluid code KHARMA   *08/2022*

Teaching Experience

Private Tutor   **Urbana, USA**

AP Calculus BC and AP Physics C   *08/2022 – 12/2022*

- Worked one-on-one with junior high school students to understand their reasoning process.
- Developed comprehensive and general frameworks to tackle most Physics problems at the high school and early college level coursework.

Extracurriculars

Introduction to digital cinema production   **Urbana, USA**

Director, camera operator, actor   *08/2022 – 12/2022*

- Helped amateur actors through drama scenes to avoid pedantic or unserious performances.
- Worked around the constraints of filming with smartphones and confined places.

Guidance for Physics Students Club   **Urbana, USA**

Member   *08/2019 – 05/2021*

- Learned about doctorate students' research on biophysics, quantum physics and astrophysics.

Honors and Awards

- Quantum Ideas Summer School Travel Grant, STAQ at Duke University   *2023*
- Yee Seung Ng Scholarship Recipient, Physics Department at UIUC   *2022*
- Richard K. Cook Scholarship Recipient, Physics Department at UIUC   *2021*
- Graduated with Academic Excellence from High School. Unweighted: 95.37%   *2018*
- 5th place at World Educational Robotics Contest, Shanghai, China   *2017*

References

Charles Gammie
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