Andres Felipe Cano Botero

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EDUCATION

University of Colorado Boulder — August 2022
MS in Mechanical Engineering — 3.95/4.0
Thesis: "Alkyl end group effects on the thermal decomposition of diesel additives"

University of Rochester — May 2019
BS in Astrophysics — 3.41/4.0

University of Canterbury — Jan 2017-May 2017
Courses toward the BS (Physics and Astronomy)

SKILLS

Languages: Python (Pandas, NumPy, SciPy, Sci-kit Learn, PyTorch), R, MATLAB, Mathematica
Data Management Software: Microsoft SQL Server, MySQL
Research: Computational physics, computational chemistry, machine learning, data mining, data science, engineering design, high-energy assemblies, high-voltage electrical assemblies,
Data: Collection, mining, analysis (statistical and numerical), and knowledge discovery
Communication: Scientific and persuasive writing, teaching, and training, public speaking
Human languages: Spanish (fluent), English (fluent), French (conversational)

PROFESSIONAL EXPERIENCE & RESEARCH

University of Colorado Boulder, Labbe Lab — Aug 2020-August 2022
Graduate Research Assistant — Boulder CO

- Wrote a high-performance computing pipeline made of python and shell scripts to generate, submit, and run quantum chemistry files on CU Boulder's RMACC Summit Supercomputing Cluster, saving days to weeks of computational work.
- Integrated the scripts with other python and C++ based software in the field developed at Argonne and Sandia National Laboratories.
- Led computational research efforts to study the combustion chemistry of biofuels.

Opera Urban Investment Firm S.A., Business Intelligence Department — Sep 2019-May 2020
Junior Data Scientist

- Created the link between the Marketing and Web Development departments by coding a Python Funnel A/B Test that extracts and analyzes client data from the company's website to maximize client outreach.
- Designed a BI App for the company which shows market trends, sales, and analysis of competitors using Python Web Scraping and Vue.js.
- Implemented an algorithm on the BI App that predicts purchases from customers enrolled in the fidelity program, predicts market tendencies, and dynamically adjusts prices on the company website.

University of Rochester, Extreme State Physics Laboratory (XSPL) — Jan 2018-May 2019
Research Assistant

- Built High Voltage Transformer to supply ±200KV to the High Amperage Driver for Extreme States (HADES) that is being built in at XSPL to study plasma physics.
- Coded, designed, and implemented intelligent electric circuit board that powers a remote-control plasma cutter used for precision metal cutting.
- Assisted in the construction of the High Amperage Driver for Extreme States by designing, engineering, and adding mechanical parts and electrical components to HADES.

*Holds US work authorization

PROJECT EXPERIENCE

3D Chess Engine Aug 2021-present

- Currently modifying the deep neural network within the Leela Chess Zero (lc0) engine to accept, analyze and respond to a 3D chess variant called Millenium 3D Chess.

Sentiment Analysis on Reddit Electric Vehicle Posts Aug 2021-Dec 2021

- Analyzed 5 years' worth of the sentiment change of posts related to electric vehicle adoption using python web scraping and NLP libraries such as Scrapy, TextBlob and Vader.

Hydrogen Flam Front Simulation Jan 2021-May 2021

- Developed a Python CFD script that simulates a Hydrogen flame front and integrates a random forest algorithm that improves accuracy through hyperparameter tuning.

Wildfire Likelihood Predictor Aug 2020-Dec 2020

- Developed a Python KNN machine learning algorithm that predicts the likelihood of a wildfire given initial conditions like latitude, longitude humidity, windspeed, and precipitation.

Chaos in a Dripping Faucet (Senior Project) Jan 2019-May 2019

- Showed evidence of chaotic behavior in a dripping faucet from an experimental setup by applying data visualization and reduction techniques using Python and a MATLAB image processing tool.

Sunspot Cycle Project (Study Abroad research) Jan 2017-May 2017

- Calculated the angular speed of the sun and proved the Sunspot cycle by acquiring and analyzing image data from the University of Canterbury Mt John Observatory on Lake Tekapo.

AWARDS & HONORS

Lorenzo de Zavala Scholarship, National Hispanic Institute 2015-2019
Sigma Pi Sigma (Physics Honor Society) 2019-present

ACADEMICS / RELEVANT COURSES

Graduate: Machine Learning, Data Mining, High Performance Computing, Computational Physics, Applied Mathematics, Computational Fluid Dynamics, Turbulence

Undergraduate: Waves and Optics, Advanced Laboratory Physics, Quantum Mechanics, Classical Mechanics, Electricity and Magnetism I & II, Applied Boundary Value Problems, Gravitation and General Relativity, Stellar Formation, Thermodynamics and Statistical Mechanics, Complex Analysis