Juan de la Cruz

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Education

University of the Ozarks Clarksville, AR, USA

Bachelor of Science in Mathematics and Chemistry, Minor in Economics *Graduation Date: December 2021*

Experience

Data Analyst and Health Informant Intern Aug 2020 – Dec 2021

University of the Ozarks *Clarksville, AR, USA*

- Built tools for automated collection to create data visualizations and dashboards for the university's business unit, marketing department, and institutional research.
- Created new, experimental frameworks to collect data from Salesforce CRM environment.

Academic Tutor - Student Success Center & TRIO Program Aug 2018 – May 2020

Jones Learning Center *Clarksville, AR, USA*

- Enhanced student learning by optimizing a wide range of instructional approaches and innovative activities.
- Supported 13 students to improve academic achievements in Calculus, Discrete Mathematics, and Chemistry.

Research

Research Assistant - XSEDE Empower Program Fellow May 2021 – Dec 2021

National Science Computational Institute *Fayetteville, AR, USA*

- Performed 5,000 2D in-compressible turbulent-mixing simulations using the Arkansas High-Performance Computing Center (AHPCC) and Stampede2 from the XSEDE computational resources to asses the efficacy of Fourier Neural Networks in simulating the Rayleigh-Taylor (RT) instability.
- Built a database of simulations of the RT instability with Large Eddy Simulations with and without the subgrid scale model and investigated the numerical differences using the VisIt package.
  Mentor(s): Dr. Tulin Kaman [Lab Website]

Research Assistant - INBRE Summer Research Fellow May 2021 – Jul 2021

University of Arkansas *Fayetteville, AR, USA*

- Programmed Metropolis and Subspace Sampling Monte Carlo methods Algorithms in C to simulate a system of particles under the canonical ensemble with 10^9 iterations.
- Executed Chi-Square analysis to evaluate the performance of several MC algorithms in a double-well potential with high energy barrier.
  Mentor(s): Dr. Feng Wang [Lab Website]

Research Assistant - CIMAV Summer Research Fellow Jun 2019 – Jul 2019

Advanced Materials Research Center *Chihuahua, Mexico*

- Performed research in the 15^{th} Summer Research Program at CIMAV in the computational crystallography lab.
- Introduced an automatic-fitting option for various parameters in a 2D X-ray diffraction novel software package (ANAELU) through genetic algorithms. [Poster]
  Mentor(s): Dr. Luis Fuentes Montero, Dr. Luis E. Fuentes Cobas, PhD student: Edgar Eduardo Villalobos Portillo

Projects

COVID-19 Dashboard | *Python, Tableau, Salesforce API, Git* Website, Article

- Prepared data dashboards and other visualizations to support decision-making for COVID surveillance, outbreak and response activities at the university.
- Performed Python data analysis, data mining, and metric analysis.

FlowChecked | *Python, JavaScript, Node JS, HTML/CSS, Git* Website, GitHub

- Implemented Navier-Stoke equation to build 2D simulation of the spread of airborne viruses in indoor spaces.
- Applied the finite difference method to solve the NS equation in various layouts.

Pink Code | *Python, JavaScript, AWS, HTML/CSS, Git* Website, GitHub

- Applied image enhancement operations like contrast, color-balance, and sharpening to get meaningful insights from a dataset of mammography scans.
- Created a convolutional neural network to classify mass lesions as benign or malignant with 93 % of accuracy.

Technical Skills

Programming languages: Python, C/C++, SQL, MATLAB, R, HTML/CSS, JavaScript.
Tools & Utilities: Git, Power BI, Tableau, LaTeX, Google Cloud Platform, VS Code, PyCharm.
Software: AutoDock Vina, Spartan Student Version, ChemDraw , ChemSketch, visIt, Microsoft Office.
Languages: Spanish (Native), English (Fluent).

Laboratory Skills

Analytical Devices
Mass Spectrometry (GC/MS, ESI/MS, TL/MS, MALDI-TOF)
Nuclear Magnetic Resonance (^{13}C, ^{1}H, DEPT)
Chromatography (HPLC, TLC)
UV-vis Spectrometer
Chemical assays
General skills (distillation, pipetting, titrations and reflux)
Organic chemistry (extraction, purification, and synthesis)
Gravimetric Analysis

Leadership Positions

President of Ozarks Coding Society 2020 - 2021
- Oversaw on-campus cryptographic competition to motivate the general student population to improve their analytical and problem-solving skills.
- Coordinated several club meetings with 23 students to discuss and propose solutions to several coding problems.

President of Ozarks Mathematical Society 2019 - 2020
- Headed weekly club meetings with 15 students to solve math puzzles in number theory, algebra, and advanced calculus in preparation for the state math competition.

President and Founder of Scientific Youth Tabasco [Facebook Page] Summer, 2018
- Started and operated a non-profit to inspire lifelong engagement in science in under-represented and marginalized communities at Tabasco, Mexico
- Motivated 50 students high school students to study science through weekly workshops and 2 talks.

Awards and Scholarships

Outstanding Mathematics Student Award May, 2021
University of the Ozarks, Clarksville, Arkansas, USA
The outstanding mathematics student award honors students for outstanding achievement in the study of mathematics.

3rd Place Award, COVID-19 Data Challenge: Life and Work in Border Communities Nov, 2020
University of California San Diego, The Border Solutions Alliance & The West Big Data and Innovation Hub
Led multidisciplinary team to create FlowChecked, an airflow simulation program to predict the propagation of airborne viruses in closed spaces using differential equations.

1st Place Award, CdeCMx Challenge: Health and Environmental Impact Aug, 2020
Clubes de Ciencia, Mexico
Led multidisciplinary team to analyze the epidemiological outbreak of COVID-19 in Mexico and Geo-spatial Analysis of COVID-19 related tweets.

1st Place Award, Arkansas Undergraduate Mathematics Competition Mar, 2019
Arkansas, USA
Placed first in an annual state-wide mathematics team-based competition consisting of a three-hour 10-question test that emphasized problem-solving skills in the areas of real analysis, number theory, and abstract algebra.

2nd Place Award, Annual Arkansas Phi Beta Lambda Competition: Statistical Analysis Apr, 2019
Phi Beta Lambda, USA

2nd Place Award, Integration Bee Competition MAA OK-AR Section Apr, 2019
Mathematical Association of America, USA
Placed second among 80 undergraduate students from Oklahoma and Arkansas universities.

2nd Place Award, Math Jeopardy Competition MAA OK-AR Section Apr, 2019
Mathematical Association of America, USA
Place second among 17 teams from various Oklahoma and Arkansas universities.

Walton International Scholarship: Full Ride Scholarship Jan, 2018
Walton International Scholarship Program, Mexico
A scholarship that provides free college education for the brightest and most capable students from Central America and Mexico - WISP Class 2021.