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: 2021*

Experience

Data Analyst and Health Informant Intern — Aug 2020 – Present
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 institution 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 students to improve academic achievements in Calculus, Discrete Mathematics, and General Chemistry

Research

XSEDE Empower Program Fellow — May 2021 – Present
National Science Computational Institute — *Fayetteville, AR, USA*

- Performed 3D 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 Neural Graph Networks to simulate the Rayleigh-Taylor (RT) instability.
- Built a database of simulations of the RT instability with Direct Numerical Simulation and Large Eddy Simulations with subgrid scale model and investigated the numerical differences using the VisIt package.
  Mentor(s): Dr. Tulin Kaman [Lab Website]

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.
- 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]

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.

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	2021
President of Ozarks Mathematical Society	2020
President of Scientific Youth of Tabasco (Juventud Científica de Tabasco)	2018

Awards and Scholarships

1st Outstanding Mathematics Student Award	May, 2021
3rd COVID-19 Data Challenge: Life and Work in Border Communities	Nov 2020
1st CdeCMx Challenge: Health and Environmental Impact - Visualization Category	Aug 2020
1st Arkansas Undergraduate Mathematics Competition	Mar 2019
2nd Annual Arkansas Phi Beta Lambda Competition: Statistical Analysis	Apr 2019
2nd Integration Bee Competition MAA OK-AR Section	Apr 2019
2nd Math Jeopardy Competition MAA OK-AR Section	Apr 2019
3rd A.R.C.H. Symposium Oral Presentation	Apr, 2019
1st Walton International Scholarship: Full Ride Scholarship	May 2018