Sebastián A. Cruz Romero

Mayagüez, Puerto Rico
(787) 601-1026 • sebastian.cruz6@upr.edu • romerocruzsa • romerocruzsa
0000-0003-3892-2273

Education

University of Puerto Rico at Mayagüez — **Mayagüez, PR**
B.Sc. in Computer Science and Engineering — *May 2025 (Expected)*
GPA: 3.47/4.00

Relevant Courses: Database Systems, Introduction to Artificial Intelligence, AI-methods in Enabling Smart Cities, High Performance Computing, General Biology I & II, Cellular and Molecular Biology for Engineers, Probability & Statistics for Engineers

Skills

Programming: Python (Advanced), C/C++ (Intermediate), MATLAB, R/RStudio, HTML/CSS/JavaScript, Swift (Beginner)

Frameworks & Tools: **Scripting** (Git, Shell), **Data Science & Analytics** (NumPy, Pandas, Matplotlib, Seaborn, SciPy, Scikit-learn), **Deep Learning & Computer Vision**(PyTorch, PyTorch Lightning, MONAI, OpenCV, Pillow, TensorBoard), **Edge Computing** (PyTorch Quantization, TensorRT, CoreML), **Full-stack** (React, Flask, MongoDB, MySQL, PostgreSQL, Vector Databases)

Languages: English, Spanish (Fluent), Portuguese (Beginner)

Technical Experience

Research Fellow, Edge Computing [GitHub] — **2024–Present**
University of Puerto Rico at Mayagüez, Dr. Wilfredo Lugo Beauchamp — *Mayagüez, PR*
- Fine-tuned SOTA-architectures for anemia severity (no anemia, mild, moderate, severe) and hemoglobin level estimation through the inner-eyelid membrane and achieved an average of 85% accuracy and 88% precision across models.
- Explored model compression methods through quantization of FP32, FP16, INT8, and INT4 bit-width precision achieving comparable performance to larger SOTA algorithms.
- Implemented a multi-task loss algorithm for effective knowledge distillation that improved accuracy and precision on previously underperforming models with a 7% increase across metrics.

Trainee, Artificial Intelligence-Machine Learning Intensive [GitHub] — **Summer 2024**
Apple, NACME Inc. & University of Southern California, Dr. Corey Baker — *Los Angeles, CA*
- Led a four-person team in two weeks to improve Automatic Speech Recognition (ASR) models, using PyTorch and Transformer model Whisper, by fine-tuning on accented english speech and achieved a 15% reduction in Word Error Rate (WER) and a 10% decrease in validation loss.
- Designed preprocessing pipeline for large-scale Audio and Text data for feature extraction, and hyperparameter tuning using Torchaudio and Pandas.

Visiting Researcher, Bioinformatics — **Summer 2023**
Massachusetts Institute of Technology & Whitehead Institute for Biomedical Research, Dr. Olivia Corradin — *Cambridge, MA*
- Conducted ChIP-seq data analysis on post-mortem brain tissue to identify gene regulatory alterations associated with opioid use disorder (OUD).
- Utilized bioinformatics tools such as SciPy, Pandas, and Numpy to filter and reduce the dataset from 3.5 million samples to 440 statistically significant ones.
- Visualized statistically significant chromosomic regions through Quantile-Quantile and Volcano plots to identify highly expressed regulatory elements within normally distributed results. Identified highly enriched patterns of associated GWAS traits and putative gene targets within case opioid overdose subjects, specifically loci tied to insomnia and schizophrenia.

Researcher, Biomedical Signal Processing — **2023-2024**
University of Puerto Rico at Mayagüez, Dr. Heidy Sierra — *Mayagüez, PR*
- Wrangled data from the Medical Information Mart for Intensive Care (MIMIC) III Clinical Database, and Waveform Database to obtain patients that were diagnosed with sepsis-related afflictions and had photoplethysmography signals in their medical record.
- Preliminary work suggests signal peaks give insight to sepsis severity with a 88.4% accuracy rate of detection.

Ignite Intern, Learning and Perception Research — **Summer 2022**
NVIDIA, Dr. Orazio Gallo and Dr. Ekta Prashani — *Santa Clara, CA*
- Developed method for image quality estimation and corruption correction with a denoising model for high-resolution images (the HDR+ and CIFAR-10 datasets) using the PyTorch framework and VGG-16 architecture.
- Evaluated image aesthetics by simulating various levels of corruptions (Noise, Blur, and Exposure) and visualized training progress with TensorBoard, including loss metrics and images before, during, and after denoising.

Visiting Researcher, Biomedical Imaging — **Summer 2021**
University of Iowa, Dr. Hans Johnson — *Iowa City, IA*
- Created a preprocessing pipeline to split and sort the PREDICT-Huntington's Disease MRI-image dataset into training, validation, and test sets.
- Refactored Convolutional Neural Network to develop Binary Classifier for male & female MRI scans using pre-trained model DenseNet121, PyTorch Lightning framework, and MONAI library resulting in 91.44% accuracy in test dataset.

Research Assistant, Environmental and Inorganic Chemistry — **2020-2022**
University of Puerto Rico at Mayagüez, Dr. Martha L. López Moreno — *Mayagüez, PR*
- Synthesized ZnS and ZnS doped Mn, stable and unstable in water, quantum dots through a reflux system to a ensure a green chemistry method was completed. Explored method for stable in water CuS nanoparticles synthesis.
- Characterized ZnS and ZnS doped Mn quantum dots and analyzed High Resolution Transmission Electron Microscopy, Electron Diffraction, and Energy Dispersion X-ray analysis to observe our quantum dots size, structure, and morphology.
- Evaluated the toxicological effects in plants with experimental procedures using lettuce, *Lactuca sativa.*

Publications

Conference: *Performance Analysis of Post-Training Quantization for CNN-based Conjunctival Pallor Anemia Detection*, ISICN 2025
Pre-print: *Fine-tuning Automatic Speech Recognition Models for Accented Speech*
Conference: *LSTM Model for Sepsis Detection using PPG Signals*, ISICN 2024, Springer Nature AG
Journal: *Synthesis, characterization, and photocatalytic activity of ZnS and Mn-doped ZnS nanostructures,* 2021, MRS Advances

Honors & Awards

Fellowships:

CAWT Undergraduate Research Fall & Spring Internship [NSF OIA-1849243] **2024–Present**
MARC UPRM Trainee [NIGMS T34GM008419] **2022–2023**
Computational Bioengineering REU Program [NSF EEC-2049044] **2021**
PR-LSAMP Research Opportunities for Undergraduates Students in STEM (ROUSS) **2020–2022**

Scholarships:

Apple Pathways Academy Scholarship **2022–2025**
Nagnoi, LLC Scholarship **2022**
Boston Scientific Scholarship **2022**
Bristol Myers Squibb Scholarship **2022**
Boeing Academic Excellence Scholarship **2022**
Hispanic Scholarship Fund (HSF) Scholarship **2021–2024**
EcoEléctrica Scholarship **2019–2022**

Travel Grants:

Broader Engagement Program @ SIAM Conference on Computational Science & Engineering **2025**
NSF I-Corps Site UPRM Travel Award for Octane Medical Innovation Forum **2024**
Annual Biomedical Research Conference for Minoritized Scientists Student Full Travel Award **2023**
Annual Biomedical Research Conference for Minoritized Scientists Student Partial Travel Award – Housing **2022**
Broader Engagement Program @ SIAM Conference on Mathematics of Data Science **2022**

Leadership Experience

IEEE Computational Intelligence Society UPRM Student Branch Chapter **2024–Present**
Founder & President, Dr. Wilson Rivera Gallego

- Developed work plans, coordinated with university departments to foster artificial intelligence education, and secured sponsorships from industry partners through detailed proposals.

IEEE Engineering in Medicine and Biology Society UPRM Student Branch Chapter **2021–Present**
Annual BioX Symposium on Engineering in Medicine and Biology Coordinator , Dr. Pedro J. Resto

- Organized the BioX Symposium, fostering growth in engineering research within medical and biological sciences at UPRM, with the 2024 edition featuring 38 poster presentations and 156 attendees, making it the largest student-organized event on campus.

2023-2024

Student Mentorship Program Coordinator

- Established a 12-week mentorship program for undergraduate freshmen and sophomores, coordinating technical and professional series, with 82% of mentees securing internships in academia and industry.

2023-2024

Secretary

- Prepared summer work plans, managed logistics, and led administrative duties in collaboration with various UPRM departments and IEEE sections, enhancing the bioengineering research community.

2022-2023

President

- Developed work plans, coordinated with university departments to foster bioengineering education, and secured sponsorships from industry partners through detailed proposals.

2021-2022

Student Activities Coordinator

- Organized logistics for workshops and events, enhancing member experiences and fostering professional development through interactions with companies, faculty, and students.

Teaching Experience

Research Mentor (4 Students): Edge Computing and Machine Learning, Spring 2025, Dr. Wilfredo Lugo Beauchamp
Teaching Assistant (30+ Students): Introduction to Computer Programming, Fall 2024, Dr. Bienvenido Vélez & GIR Jean C. Méndez
Teaching Assistant (30+ Students): Introduction to Computer Programming, Fall 2023, Dr. Heidy Sierra & GIR Cambell Christensen
**GIR: Google-in-Residence Instructor*