Pedro A. **Alarcon**

MS Prospect in Computer Science · Intelligent Systems

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Objective

Goal-oriented and tenacious individual with diverse range of interdisciplinary knowledge within Physics, Mathematics, Machine Learning, Computer Science and Electro-mechanical Systems. To pursue a MS is Computer Science and Engineering seeking to develop an advanced theoretical framework through extensive research and complex project within the intersection of real-time embedded software applications, autonomous data acquisition/analysis, and cloud programming. Eager to advance the frontiers of research.

Education

SMC (Santa Monica Community College) *Santa Monica, California*

PROFESSIONAL DEVELOPMENT: COMPUTER SCIENCE CERTIFICATE *Jun. 2018 - Present*

- **Fundamentals: Data Structures, Operating Systems, C++ Programming, Network Fundamentals & Architectures (In Progress), Java Programming (In Progress)**
  Hardware Architecture, Real-Time Scheduling, Virtual Memory, Paging, STL library, Algorithm Efficiency(Big O), Data Structures(Trees, Linked Lists, Hash Tables, Queues, Stacks) Sorting & Searching (QuickSort, MergeSort, RadixSort) Dynamic Storage

UCLA Extension (University of California, Los Angeles) *Los Angeles, California*

PROFESSIONAL DEVELOPMENT: DATA SCIENCE CERTIFICATE *Jan. 2018 - Present*

- **Intro to Data Science, Machine Learning**
  Supervised/Unsupervised Learning, Neural Networks, Dimensional Reduction Algorithms, Sampling (Validation, Cross-validation, LOOCV), Data Exploration (Uni-variate/Bi-variate Analysis), Python and R/RStudio programming

UCLA (University of California, Los Angeles) *Los Angeles, California*

BACHELORS OF SCIENCE IN ASTROPHYSICS *Sep. 2013 - Jun. 2018*

- **Computer Science: Intro to Programming using C++, C++ Programming**
- **Mathematics: Calculus (I, II, II), Linear Algebra, Differential Equations, Intro to Stats, Mathematical Methods of Physics**
  Fourier Series/Analysis, Fourier and Laplacian Transforms, Vectors and fields in space, linear transformations, inner products, eigen-decomposition; Combinatronics, Permutations, Bayesian)
- **Physics: Statistical Mechanics, Astrophysics Lab, Electricity and Magnetism Lab, Modern Physics Lab, Radiation and Fluids in Astrophysics, Analytical Mechanics, Quantum Mechanics**
  RLC Circuits, PCB and PID Controllers, Diodes and Transformers, low/high-pass filters, Stochaic Processes, Autonomous Digital Image Acquisition, pre-processing, feature extraction, statistical and numerical methods, Gaussian and Poisson Statistics

Technical Skills

Programming Languages	C/C++, Python 2.7/3.0, VBA, Bash, R/RStudio, Java
Computing Languages	Mathematica, Matlab, LabVIEW, LaTeX,
Machine Learning	ANN, PCA, Logistic Regression, LDA, Trees/Random Forest, SVM/SVA, GAM, Ridge Regression, Lasso
OS & Applications	Windows (XP, 7, 10), Unix/MacOS, Linux, Version Control (Git/Github), ssh

Relevant Experience

Upsilon Lab *UCLA*

PROJECT LEAD - THEORY & SIMULATION *September 2017 - June 2018*

- Planned, prepared, and implemented research-oriented project. Successfully managed an undergraduate physics team of 8 into the design and development of an isochronous cyclotron particle accelerator simulation in Python. Showcased project highlights in Spring 2018 physics workshop.
- Provided weekly instructional sessions in topics ranging from numerical analysis and algorithms, Python Object-Oriented methodology/techniques, physics of particle accelerators, LaTeX documentation, and Git/GitHub overview .
- Monitored and reviewed member's coding scripts and provided debugging support.
- Reported quarterly progress to Physics department chair and advisory board. Hosted Python workshop for the physics department.

Undergraduate Summer Research (Prof. Arisaka)

UCLA

RESEARCH ASSISTANT

June 2017 - October 2017

- Developed numerical simulation script in Mathematica that modeled Fick's second law of diffusion in radial gradient assays. Model quantitatively ascertained values of spatial gradient of NaCl concentration and served as a foundational mechanism to analyse and evaluate sensory response and locomotion induction in C. elegans.
- Implemented binary image pre-processing techniques (image sequencing, thresholding, feature extraction, geometrical transformations). Utilize skeletonization algorithms for object compression, matching and tracking and quantitatively analyzed locomotion parameters in Matlab
- Conducted various experiments and performed data acquisition with the aim to undertake a physics approach to the understanding of consciousness by examining behaviors and undulatory locomotion of C. elegans when exposed to various external stimuli (ex. electromagnetic fields, chemical gradients and thermal heat).
- Succesful chemotaxis experimental recreation of Lino and Yoshida's scientific paper involving locomotion analysis of C.elegans in salt spatial gradients.

Selected Projects

UCLA

SIMULATIONS

Jan. 2018 - Present

- Implemented OOP methodology and RK4 integration algorithm to solve for Maxwell's equations of electromagnetism in order to simulate and analyze an Isochronous-Cyclotron Particle Accelerator in Python.
- Implement Lagrangian mechanics to simulate dynamic behavior of double pendulum systems. Application of chaotic motion.

UCLA Extension

MACHINE LEARNING

Jun 2018 - Present

- Utilized data exploration, feature engineering techniques and various classification machine learning algorithms to build a predictive model that determines whether a bank loan applicant can be a defaulter or not, in order to avoid capital loss and maximize profit. Model predictions resulted in a 7% per applicant profit.
- Implemented PCA to ascertain and eliminate redundant data and built a neural network model to classify hand written number digits.

UCLA

DIGITAL SIGNAL PROCESSING

Jan 2017 - Jan 2018

- Designed and constructed Amplified Modulation RF Receiver and developed LabVIEW application with user-interface to record, modify, and analyze electromagnetic sounds waves acquired from receivers.
- Developed Mathematica script to visualize and analyze spectral decomposition for continuous, discrete, periodic and non-periodic signals. Application to radio AM signals.
- Wrote Python scripts for autonomous pre-processing (resampling, noise reduction, feature extraction) and analysis (image segmentation, image stacking) of digital images acquired from CCD image sensors.

Professional Experience

Vokshori Law Group

Downtown LA

OPERATIONS MANAGER

Oct. 2018 - Present

- Provide user-end network, hardware, software troubleshooting support. Diagnose PC performance (Windows 7/10) and recommend hardware upgrade as needed.
- Screen, interview and evaluate intern applicants. Train, supervise and delegate projects to interns.
- Oversee Financial/HR/IT departments.

Honors & Awards

DOMESTIC

2014	**Ola Zuckerman Scholarship**, Academic Achievement	*UCLA*
2013	**Vice Provost Recognition Award**, Academic Achievement	*UCLA*
2014-2015	**Corman Education Fund**, Scholarship for Academic Achievement	*UCLA*
2013	**Green Dot Recognition Award**, District wide scholarship competition	*Los Angeles, U.S.A*
2013	**1st Place**, High School Physics Science Fair	*Los Angeles, U.S.A*