Juan Pablo Gamucero Arana

Undergraduate Physics Student

+52-412-143-5725 | gamucero@ciencias.unam.mx | Juan Pablo Gamucero | GamuceroJP
gamucerojp.github.io

Education

Universidad Nacional Autónoma de México Expected Dec 2022

Bachelor of Science in Physics *GPA: 3.7/4.0*

- **Relevant Coursework:** Probability and Statistics, AI applied to Physics, Computational Physics, Bayesian Inference, Data analysis, Calculus, Linear Algebra, Differential Geometry, Partial Differential Equations, Dynamical Systems, Quantum Mechanics, Gravitation and Relativity, Advanced Mathematics for Physics, Data structures and algorithms, Basic competitive programming

Experience

Assistant Professor at Physics Laboratory Jan-Jul 2016

ENMS, Guanajuato University *Guanajuato state, México*

- Extracurricular Physics and Mathematics lessons at Physics laboratory. Trained students for academic contests.

Content Developer at Animathica Youtube Channel Jan 2021-current

Animathica, UNAM *Mexico City, Mexico*

- Collaboration with content development team of Animathica, a project developed by a group of students from UNAM Science School. We animate mathematical concepts using Manim library in Python. OOP programming.
- Currently developing animations about Linear Algebra, inner product vector spaces.

Social service May-Dec 2021

Instituto de Ciencias Nucleares, UNAM *Mexico City, Mexico*

- Program: Frontiers in precision cosmology: from alternative theories of gravity to cosmo-statistics with machine learning. Dynamical systems applied to Cosmology.

Skills

Programming Languages: Python, C, C++, R, SQL, Object Oriented programming, Structured programming, Wolfram Mathemtica, Arduino, HTML, CSS, Java Script
Libraries: Numpy, SciPy, Pandas, Matplotlib, Seaborn, Scikit-learn, Sympy, Tkinter, Serial, Manim
Frameworks: Keras, PyTorch, Tensorflow 2, Django
Tools: Linux, command line, Git, GitHub, Google Colab, VS Code, Overleaf, Inkscape, gnuplot
Languages: Spanish(Native), English (High intermediate (B2))

Projects

Pulsar Detection | *PyTorch, Numpy, Pandas, Matplotlib, Seaborn, Scikit-learn* Jan 2021

- Developed a binary classifier to identify pulsars using HTRU2 dataset with Pytorch.
- Evaluated the model using confunsion matrix and found this architecture has an 85% sensitivity whereas its specificity is almost 100%.

DAQ System Developement | *Arduino, App Inventor, Bluetooth and Serial communication* Jan 2021

- Developed a data acquisition system using Arduino and an Android App.
- Generated a time series of the values obtained by a LM35 temperature sensor.
- Showed time series of the temperature in the app interface and simultaneously streamed data to Google sheets.
- Used the DAQ system to test Newton's Law of Cooling for water within air. Did estimation of parameters with Scipy.optimize.

Numerical Solution to Heat Equation in C | *C language, call by reference with pointers* Jul 2020

- Implemented Crick-Nicholson algorithm to solve an initial value problem with boundary conditions of the heat equation.
- Improved performance from $\mathcal{O}(n^3)$ using naive solution to $\mathcal{O}(n)$ by using this algorithm (with n the grid size).

Achievements

Second Place 2014

State of Guanajuato Maths Olympiad *Guanajuato, Mexico*

Second Place 2014

State of Guanajuato Physics Olympiad *Guanajuato, Mexico*