SEBASTIÁN AGUILERA NOVOA

Physicist - Professor - Python Programmer

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EXPERIENCE

Junior Python Developer

MarBAI

Mar 2024 – Today remote

- Create, deploy, and evaluate intelligent agents using Python, the ChatGPT API, and REST APIs to generate digital content for social media.

University Professor

Escuela Tecnológica Instituto Técnico Central (ETITC)

Mar 2024 – Jun 2024 Bogotá, Colombia

- Teaching java programming (Backend and Frontend), databases, operating systems, and data structure to university students of systems engineering.

Internship in Molecular Modeling and Simulations

São Carlos Institute of Physics - University of São Paulo

Feb 2023 – Apr 2023 São Carlos, Brazil

- Set up and contrast Monte Carlo (MC) and molecular dynamics (MD) simulations of a protein-ligand system to generate structured data (positions, velocities, RMS, etc).
- Analyze the structured data generated by the MC and MD simulations using Markov model algorithms (lag-time, hiden markov chains, etc).

MAAD - Soundscape Analysis in Python

scikit-maad project

Jan 2023 – Feb 2023 Bogotá D.C., Colombia

- Create spectral and time traits with examples, test, and documentation.

Summer Research Program

Electrical & Computer Engineering - University of Delaware

Jun 2021 – Sep 2021 Delaware, EEUU

- Analyze and visualize long raw audio data using signal processing and Matlab, 2-week continuous records from a microphone in a the Delaware Bay river.

INTERESTED IN

Acoustics | Machine Learning | Languages | Ecology | Simulations | Music | Teaching

EDUCATION

B.Sc. in Physics

National University of Colombia

2015 – 2023 Bogotá D.C.

Residential Electrical Installation Technician

Servicio Nacional de Aprendizaje (SENA)

2012 – 2013 Bogotá D.C.

MOST PROUD OF

Awarded Jhoti and Salazar Scholarship

São Carlos Institute of Physics (IFSC)

2023 São Carlos, Brazil

Second best undergraduate dissertation in physics

Physics Department, UNAL

2023 Bogotá, Colombia

STRENGTHS

Hard-Working | Eye for detail | Fast-Learning | Creativity | Adaptability | Passionate | Curious | Problem Solving | Autodidact | Leadership | Mathematical Modeling | Critical Thinking | Active Listening | Empathy | Patience | Analysis

PROJECTS

Birdsongs

National University of Colombia

Aug 2022 – Currently | Bogotá D.C., Colombia

- Python packing of the **motor gestures for birdsongs** model that simulates the sound production in birds.
- Automate the generation of synthetic birdsongs (audio/images) using numerical optimization theory and algorithms, numerical methods, and signal processing.
- Study and analyze of bandwidth as function of the length of the trilled syllables (last syllables of the birdsongs) for several Zonotrichia Capensis from different countries.
- Generate comparable synthetic birdsongs of some Colombian bird species: Zonotrichia Capensis, Rhinocryptidae, and Mimus Gilvus.

Molecular Modeling and Simulations

University of Sao Paulo

Feb 2023 – Apr 2023 | Sao Carlos, Brazil

- Study and evaluation of molecular simulations of the un/binding kinetics in a protein-ligand system.
- Set up and execution of several MD and MC simulations for different systems.
- Analysis the un/binding events of the MD and MC simulations by numerical analysis.

Aprender - A New Way of Learning

Freelance

2019 – 2022 | Bogotá D.C., Colombia

- Design, create and host a homepage for the preparatory.
- Implement the Moodle platform on the homepage as a Learning Management Platform.
- Mathematics and physics teacher: design and creation of lessons and tests for evaluation.

Recorder Characterization

National University of Colombia

2020 | Bogotá D.C., Colombia

- Study the recorder musical instrument from experimental, theoretical, and computational physics.
- Analyze and visualize the structured data generated and measured from the study in order to compare them.

LANGUAGES

Spanish
English
Portuguese
German

WORKSHOPS/SCHOOLS

Poster Presentation - III Conferencia Colombiana de Matemáticas Aplicadas e Industriales (MAPI 3)

Comisión de Matemáticas Aplicadas e Industriales de la Sociedad Colombiana de Matemáticas

2024 | Bucaramanga, Colombia

Machine Learning for Quantum Matter and Technology

Workshop - Organized by Universidad de los Andes

2019 | Bogotá, Colombia

PUBLICATIONS

Books

- S. A. Novoa, *Design, development, and evaluation of a computational physical model to generate synthetic birdsongs from recorded samples*. National University of Colombia, digital archive., 2022, Bachelor's Dissertation.

SOFTWARE SKILLS

Python, Latex, Office, VSC
Java, Github, Linux, SSH, Matlab
Jupyter-Notebook, Markdown
Julia, Krita, C++, Power BI
Mathematica, Canva
JS, HTML, SQL, CSS, Workbrench

PYTHON LIBRARIES

Matplotlib, Numpy, Plotly, Pandas
Tensorflow, OpenAI, Scipy
Pytorch, Scikit-Learn, Pytest, Lmfit
PeakUtils, Sympy, Seaborn, Librosa
Scrapy, Django, Flask, OpenCV

- Development wave acoustic pressure visualization using a LBM and Paraview for comparison with measurements.

Acoustic Simulation of a Classroom

National University of Colombia

2019 Bogotá D.C., Colombia

- Modeling and simulation of a conference classroom using the Lattice Boltzmann Method (LBM), writing in c++ using OOP, to generate comparable structured data.
- Physical and computational measurement of classroom reverberation time for comparison.

Physics Laboratories

National University of Colombia

Aug 2015 – Dec 2021 Bogotá D.C., Colombia

- Set up laboratories to validate physical theories by measuring structured data (physical measurable quantities).
- Create lab reports with the state of art, discussion and analysis (involving mathematical fittings to the structured data), methodology, and conclusions.

TRAINING/CERTIFICATIONS

Sequence Models

Coursera

2024 Online

Convolutional Neural Networks

Coursera

2023 Online

Structuring Machine Learning Projects

Coursera

2023 Online

Introduction to Structured Query Language (SQL)

Coursera

2022 Online

Neural Networks and Deep Learning

Coursera

2021 Online

Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization

Coursera

2021 Online

REFEREES

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