

# SEBASTIÁN AGUILERA NOVOA

Physicist - Professor - Python Programmer

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Bogotá D.C.

## 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, hidden 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, USP

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 bird-songs) 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

📅 June, 2024 📍 Bucaramanga, Colombia

Machine Learning for Quantum Matter and Technology

Workshop - Organized by UNiversity of the Andes

📅 May, 2019 📍 Bogotá, Colombia

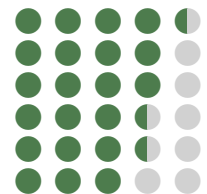
## PUBLICATIONS

### 📖 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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