

# SEBASTIÁN AGUILERA NOVOA

Physicist - Professor - Programmer

@ saguileran@unal.edu.co

+57 3195140529

saguileran.github.io

saguileran

saguileran

Bogotá D.C.

## EXPERIENCE

Junior Python Developer - Prompt Engineering

MarBAI

Mar 2024 - Today

Remote

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

Junior Python Developer - Prompt Engineering

AI GENERATIVE S.A.S. - AIGEN S.A.S.

Sep 2024 - Mar 2025

Remote

- Utilizing text-to-image models to generate digital media content for social media, featuring fictional characters or non-real personas.

Professor

Escuela Tecnológica Instituto Técnico Central (ETITC)

Mar 2024 - Dec 2024

Bogotá, Colombia

- Teaching Java programming (both backend and frontend), databases, operating systems, software design, and data structures to systems engineering university students. All courses are hosted on GitHub and can be accessed via the link courses.

Professor - Trainer

Ingresar a la U

Mar 2023 - Jul 2024

Colombia

- Teaching mathematics, physics, and tips and techniques for answering multiple-choice questions on the Saber 11 exam administered by ICFES, to school students from both urban and rural areas of Colombia.
- Training professors to instruct students on effectively answering multiple-choice questions.

Internship in Molecular Modeling and Simulations

São Carlos Institute of Physics - University of São Paulo

Feb 2023 - Apr 2023

São Carlos, Brazil

## 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

- 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.

## 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

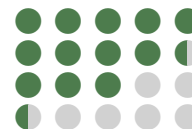
### University of Sao Paulo

📅 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.

## 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 12-14, 2024 📍 Bucaramanga, Colombia

Machine Learning for Quantum Matter and Technology

Workshop - Organized by University of the Andes

📅 May 27-31, 2019 📍 Bogotá, Colombia

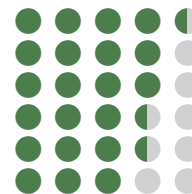
## PUBLICATIONS

### 📖 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.

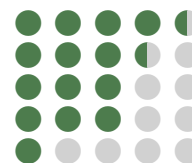
## SOFTWARE SKILLS

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, Scipy, Requests  
Pytorch, Scikit-Learn, Pytest, Lmfit  
PeakUtils, Sympy, Seaborn, Librosa  
Scrapy, Django, Flask, OpenCV



---

## 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.
- 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

---

### Prof. Francisco Gómez Jaramillo

@ National University of Colombia (UNAL)

✉ fagomezj@unal.edu.co

### Prof. Gabo Mindlin

@ University of Buenos Aires (UBA), Argentina

✉ gabo@df.uba.ar

### Prof. Alessandro S. Nascimento

@ University of São Paulo (USP), Brazil

✉ asnascimento@ifsc.usp.br