Yeison N. Cardona A.

PhD(c) | MSc | Electronic Engineer | Software Developer | Python Ninja

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Manizales Caldas - Colombia

Multidisciplinary engineer with a strong background in electronic systems and industrial automation. I specialize in backend development and DevOps workflows, focusing on scalable microservices, API architecture, and modern deployment practices. With a solid foundation in Python and a passion for building practical, maintainable systems, I've worked across desktop GUIs, scientific applications, and cloud-native infrastructure. I'm driven by innovation and always looking to take on challenging projects that blend engineering, automation, and real-world impact.

Skills

Cloud Platforms	**AWS**, **Azure**, **Google Cloud Platform**
Databases	**PostgreSQL**, TimescaleDB, SQLite, MySQL, MongoDB
Development tools	**Git**, Vim, **Docker**, **Docker Swarm**, Kubernetes, **Jupyter Notebooks**, Apache Kafka
DevOps Practices	CI/CD, Infrastructure as Code, Monitoring, Container Orchestration, Agile, Scrum
Frameworks	**Django**, **Angular**, **FastAPI**, Flask, TensorFlow, PyTorch, Keras, Bootstrap, Astro
Machine Learning	**Scikit-learn**, **TensorFlow**, **PyTorch**, Keras, Keras Tuner, WandB, Roboflow
Operating systems	**MacOS**, **Arch Linux**, Manjaro, FreeBSD, Ubuntu Server
Programming	**Python**, Bash, HTML, JavaScript, **TypeScript**, CSS, C, C++

TL;DR

Backend-focused engineer with strong experience in Python development, DevOps practices, and scalable system design. I specialize in building microservices, orchestrating containerized environments, and implementing CI/CD pipelines to deliver robust and maintainable APIs.

Beyond software engineering, I've been deeply involved in research projects—contributing to both their formulation and technical execution—while leading multidisciplinary teams. These projects often required close collaboration with client organizations and multiple partner companies, ensuring alignment of technical deliverables with broader strategic goals.

I've also worked as a consultant, helping organizations modernize their backend systems, adopt cloud-native architectures, and streamline infrastructure for performance and reliability. My work bridges engineering and infrastructure, ensuring high availability, resilience, and smooth deployment processes.

Key Skills

- Python (FastAPI, Django, SQLAlchemy)
- CI/CD with GitHub Actions, Docker, and Nginx
- Microservices architecture
- API design and RESTful services
- PostgreSQL, TimescaleDB

DevOps & Integration

- Docker and Docker Compose
- Container orchestration with Swarm
- Monitoring using Prometheus and Grafana
- Secure deployments (HTTPS, JWT, OAuth2)
- Automated testing with PyTest and Coverage

Highlighted Projects

- **Chaski-Confluent:** Distributed messaging framework with TensorFlow integration
- **BCI-Framework:** Real-time EEG experiments and signal processing
- **Qt-Material:** Material Design theme for PyQt/PySide
- **Radiant:** Web framework using Brython and Tornado
- **Docs:** Automated Sphinx documentation from Jupyter

Tooling & Automation

- Git & GitHub Workflows
- Bash scripting and Makefiles
- Pre-commit hooks and linters
- Code quality tools: Black, Flake8

Technical Proficiencies

Django Framework

Over the course of my career, I have gained extensive experience working with robust frameworks like Django, leveraging their full potential by integrating various tools and technologies to create scalable, maintainable, and high-performance solutions. My expertise spans the core framework as well as a broad range of auxiliary tools that enhance functionality, security, and performance.

Django Core

- ORM (Object-Relational Mapping)
- Django REST Framework (API Development)
- Django Channels (WebSockets and Asynchronous Support)
- Django Admin Customization
- Form Handling and Validation

Database Technologies

- PostgreSQL with Django ORM
- TimescaleDB (Time-series database with PostgreSQL)
- SQLite (Development and Testing)

Authentication and Security

- SSL and HTTPS Configurations

DevOps and Deployment

- Docker and Docker Compose for containerization
- Nginx and Gunicorn for production deployment
- CI/CD pipelines with GitHub Actions

Testing and Optimization

- PyTest and Django Test Suite
- Coverage and Performance Benchmarking
- Query Optimization and Indexing
- Celery for Asynchronous Task Management

FastAPI Framework

Throughout my professional journey, I have worked extensively with FastAPI, leveraging its high-performance features for building fast, scalable, and efficient APIs. FastAPI's use of modern Python features such as type hints and asynchronous programming has allowed me to deliver reliable and responsive API solutions. Below are some key tools and technologies I have utilized alongside FastAPI.

FastAPI Core

- Type Hints and Pydantic Models for Data Validation
- Asynchronous Endpoints for High Concurrency
- Dependency Injection for Clean Architecture
- Automatic Interactive API Documentation with Swagger and ReDoc

Database and ORM Integration

- SQLAlchemy for Database Interaction
- PostgreSQL with Async Support
- Tortoise ORM for Lightweight Async Operations

Security and Authentication

- OAuth2 with JWT Tokens for Secure Authentication
- Role-based Access Control (RBAC)

DevOps and Deployment

- Docker for Containerization
- Nginx and Uvicorn for FastAPI Deployment
- CI/CD Pipelines with GitHub Actions

Testing and Optimization

- PyTest for Unit and Integration Testing
- Benchmarking with locust.io for Performance Testing
- Query Optimization for Asynchronous Operations

TensorFlow Framework

I have extensive experience using TensorFlow for developing and deploying machine learning and deep learning models. Throughout my projects, I have leveraged TensorFlow's flexible architecture to build scalable models for various tasks, including data classification, prediction, and image processing. My expertise includes both the core TensorFlow library as well as its auxiliary tools and frameworks for optimizing performance and deployment.

Core TensorFlow

- Model Building with Keras API
- Custom Layers and Activation Functions
- Transfer Learning and Pre-trained Models
- Tensor Manipulation with TensorFlow Core

Model Optimization

- TensorFlow Lite for Edge Devices
- Model Quantization and Pruning
- TensorFlow Profiler for Performance Tuning

Distributed Training and Deployment

- Distributed Training with TensorFlow Mirrored Strategy
- TensorFlow Serving for Model Deployment
- TensorFlow Extended (TFX) for End-to-End Pipelines

Visualization and Monitoring

- TensorBoard for Model Visualization and Metrics
- Monitoring Model Training with Callbacks

Desktop Application Development

In addition to web and API development, I have a strong background in developing desktop applications using robust frameworks. My experience includes creating cross-platform, user-friendly applications that prioritize performance, scalability, and ease of use. Below are some of the key tools and technologies I have worked with in desktop development.

Frameworks and Libraries

- PyQt for Building Graphical User Interfaces (GUIs)
- PySide (Qt for Python) for Advanced GUIs
- Tkinter for Lightweight Python GUIs
- wxPython for Native-Looking Applications
- Kivy for Multi-Touch Applications

Cross-Platform Compatibility

- Packaging Applications with PyInstaller
- Developing for Windows, macOS, and Linux
- Integration with Native System Features

Additional Features

- SQLite and SQLAlchemy for Local Databases
- Asynchronous Operations and Threading
- File Handling and System Automation

Containerization and Orchestration with Docker and Swarm

I have extensive experience working with Docker for containerization and Docker Swarm for orchestration of distributed systems. My expertise includes creating and managing containers, building custom Docker images, and orchestrating multi-container environments to ensure high availability, scalability, and fault tolerance in production environments.

Docker

- Building and Managing Custom Docker Images
- Docker Compose for Multi-Container Applications
- Container Networking and Volumes
- Docker Hub for Image Storage and Distribution

Docker Swarm

- Swarm Cluster Setup and Management
- Service Scaling and Load Balancing
- Secrets and Configurations Management
- Swarm Networking and Overlay Networks

CI/CD and Deployment

- Integrating Docker in CI/CD Pipelines
- Automated Testing and Deployment with GitHub Actions
- Continuous Deployment of Swarm Services

Monitoring and Optimization

- Monitoring Container Performance with Prometheus and Grafana
- Docker Logs and Troubleshooting
- Resource Optimization for Containers

Embedded Systems and FPGA Development

I have extensive experience in the design and development of embedded systems and FPGA-based solutions, working with both hardware and software components to create efficient, high-performance systems. My expertise spans across various microcontroller platforms, FPGA architectures, communication protocols, and embedded software development tools, allowing me to deliver optimized solutions for real-time systems, IoT, and high-speed processing applications.

Microcontroller Platforms

- ARM Cortex-M Series
- ESP32 and ESP8266 for IoT Applications
- Raspberry Pi for Embedded Linux Systems
- AVR and Arduino Platforms

FPGA Development

- VHDL and Verilog for Hardware Description
- Xilinx Vivado for FPGA Design and Simulation
- Altera Quartus for FPGA Programming
- High-Level Synthesis (HLS) for FPGA Acceleration

Communication Protocols

- SPI, I2C, and UART for Peripheral Communication
- MQTT and HTTP for IoT Communication
- Modbus and CAN for Industrial Applications
- Bluetooth and Wi-Fi Integration

Embedded Software Development

- Real-Time Operating Systems (RTOS)
- Low-Level Programming with C and C++
- Python for Prototyping and Automation
- Firmware Development and Debugging

Development Tools and IDEs

- PlatformIO and Arduino IDE for Firmware Development
- Keil uVision and STM32CubeIDE for ARM Cortex Development
- JTAG and SWD Debugging Tools
- Logic Analyzers and Oscilloscopes for Hardware Debugging

Prototyping, CNC, 3D Printing, and CAD Design

In addition to embedded systems and FPGA development, I have extensive experience in prototyping, including CNC machining, 3D printing, and CAD design. I have utilized these skills in various projects to create precise, functional prototypes and parts for both hardware and mechanical systems. My expertise covers the complete design and fabrication workflow, from initial concept to final production.

Prototyping and CNC Machining

- CNC Programming and Machining for Precision Parts
- Prototyping with Rapid Tooling and Functional Parts
- G-code Generation and Optimization

3D Printing

- FDM (Fused Deposition Modeling) and SLA (Stereolithography)
- 3D Modeling for Printability and Rapid Prototyping
- Slicing Software (e.g., Cura, PrusaSlicer)
- Material Selection and Post-processing

CAD Design

- 3D Modeling with SolidWorks, FreeCAD
- Parametric and Freeform Modeling
- Assembly Design and Simulation
- Technical Drawing Generation for Manufacturing

Vector Design and 2D Modeling

- Inkscape for Vector Design and SVG Export
- 2D Sketching and Constraints in FreeCAD
- Technical Illustrations for Laser Cutting and CNC

Linux Administration and Development

I have extensive experience working with Linux-based systems, particularly in environments that require high reliability, performance, and customization. My proficiency with Linux extends from system administration and scripting to development and automation, with a deep understanding of the Linux ecosystem and tools.

System Administration

- Package Management (Pacman, apt, yum)
- User and Permission Management
- Networking Configuration (IPTables, FirewallD)
- System Monitoring and Log Management (Syslog, journalctl)

Development and Customization

- Kernel Tuning and Module Management
- Building and Configuring Custom Linux Kernels
- Arch Linux and System Customization
- Shell Scripting for System Optimization

Scripting and Automation

- Bash and Python Scripting for Automation
- Cron Jobs for Task Scheduling
- Systemd Service Configuration and Management
- Ansible for Configuration Management

Networking and Security

- SSH Configuration and Hardening
- VPN and Tunneling (OpenVPN, WireGuard)
- SELinux and AppArmor for Security Enforcement
- Disk Encryption and Secure File Transfer

Professional Experience

Present – May 2024

Adjunct Professor, Universidad Nacional de Colombia, Manizales, Caldas

Conducted in-person teaching of the undergraduate course "Digital Signal Processing" for the Electronic Engineering program at the Faculty of Engineering and Architecture, Universidad Nacional de Colombia. Responsibilities included preparing lectures, guiding practical sessions, and evaluating student performance.

Occasional Instructor

April 2025 – February 2025

Technical Lead, Disered, Bogotá

Led and coordinated a multidisciplinary team of software engineers in the design, development, and deployment of scalable microservices architectures. Defined technical strategies, ensured adherence to software engineering best practices, and maintained high standards of code quality, system reliability, and performance. Translated business requirements into robust technical solutions, guided architectural decisions, oversaw CI/CD pipelines, and fostered collaboration between technical and non-technical stakeholders. Also mentored team members and promoted innovation through modern technologies and agile methodologies.

Python | FastAPI | Docker | PostgreSQL | Google Cloud Platform

December 2024 – May 2024

Software Developer, Universidad Nacional de Colombia, Manizales, Caldas

Provided professional services as an electronic engineer with a master's degree in Industrial Automation to support the conceptual design, requirement specification, implementation, and configuration of software-defined radio (SDR) sensors. Contributed to the development of a cost-efficient and scalable prototype for radio spectrum monitoring in Colombia, integrating SDR technology with deep learning techniques.

Researcher

September 2024 – June 2023

Software Developer, Universidad Nacional de Colombia, Manizales, Caldas

Conducted research and development activities for the creation of a functional prototype of an electronic tongue aimed at identifying flavor profiles in fine cocoa of Colombian origin. The work involved sensor integration, signal processing, and system validation.

Researcher

March 2024 – June 2023

Project Formulation, Universidad Nacional de Colombia, Bogotá

Proposed a strategic plan for the establishment of the inter-campus Center of Excellence in Medicine and Artificial Intelligence (SEMAI), as part of the national call for the consolidation of centers of excellence 2020–2021.

Formulator | Researcher

December 2023 – January 2023

Software Developer, DunderLab/Universidad Tecnológica de Pereira, Pereira, Risaralda

Provided professional software development services for a gait pattern monitoring system, focusing on data acquisition, processing, and visualization to support movement analysis and rehabilitation applications.

Project Manager

May 24, 2023 – January 2023

Software Developer, DunderLab/Universidad Tecnológica de Pereira, Pereira, Risaralda

Delivered professional software development services for the creation of an information management tool designed to support the planning and coordination of Colombia's national natural gas system. Responsibilities included backend design, data modeling, and system integration.

Project Manager

May 2023 – March 2023

Student Assistant, Universidad Nacional de Colombia, Manizales, Caldas

Designed a protocol for developing a biosignal acquisition and capture system to monitor cardio-cerebral-pulmonary activity in Neonatal Intensive Care Unit (NICU) patients. Contributed to building a prototype that applied machine learning techniques to biosignal processing. The initial phase focused on system validation in a simulated environment

ESP32 | MicroPython | PostgreSQL | Django | Django Rest Framework

December 2022 – September 2022

Student Assistant, Universidad Nacional de Colombia, Manizales, Caldas

Contributed to the development of an information visualization system for campus-level research, extension, and innovation indicators. Integrated the system with the Research and Extension Department's website. Supported outreach activities, including dissemination and coordination with local and national entities, and assisted in the preparation of the office's strategic structure.

Python | Django | Dash | PostgreSQL | JavaScript | HTML | CSS

December 2022 – September 2022
Software Developer/Designer, DunderLab/Universidad Tecnológica de Pereira, Pereira, Risaralda
Developed the backend and user interface modules for a software tool focused on reconstruction and localization, as part of the project "Development of a needle tracking and nerve localization tool in ultrasound for regional anesthesia practice." The system aimed to support the treatment of acute traumatic pain and the prevention of chronic neuropathic pain.

Python | Django | TensorFlow | Matplotlib | Scikit-learn

September 2022 – June 2022
Software Developer/Designer, DunderLab/Universidad Nacional de Colombia, Manizales, Caldas
Developed software for thermographic measurement and regional anesthesia monitoring, as part of the project "Support tool for predicting the effects of local anesthetics via neuroaxial epidural using infrared thermography." The solution integrated image analysis techniques for clinical decision support.

Python | PySide | Raspberry Pi | GNU/Linux

March 2022 – January 2022
Software Developer, DunderLab/Universidad Tecnológica de Pereira, Pereira, Risaralda
Trained and fine-tuned preprocessing algorithms for EEG recordings, contributing to the acquisition module of a prototype system designed for neuropathic pain diagnosis. The work focused on improving signal quality for accurate downstream analysis.

Python | Kafka | Brython | Tornado | HDF5 | OpenBCI

January 2022 – December 2021
Software Developer/Designer, DunderLab/Universidad Nacional de Colombia, Manizales, Caldas
Developed software for the design and implementation of a neurophysiological signal acquisition module, as part of the research project "Enhanced and interpretable deep learning framework to support computer-assisted diagnosis systems." The work enabled real-time data capture for machine learning applications in healthcare.

Python | Kafka | Brython | Tornado

November 2021 – July 2021
Software Developer, DunderLab/Universidad Tecnológica de Pereira, Pereira, Risaralda
Implemented a web-based user interface for a software tool designed to support the diagnosis of Attention Deficit Hyperactivity Disorder (ADHD), enabling intuitive access to data visualization and diagnostic resources.

Python | PySide | Kafka | HTML | CSS | Brython

May 2021 – September 2019
Student Assistant, Universidad Nacional de Colombia, Manizales, Caldas
Performed morphological characterization of brain structures using medical imaging techniques to support surgical implantation of neurostimulators for Parkinson's disease treatment. Developed image classification methodologies, registration algorithms, and contributed to the construction of anatomical atlases.

Python | PySide | Kafka | HTML | CSS | Brython | OpenBCI | Raspberry Pi | JavaScript | Django | Numpy | Scipy | Matplotlib

Projects

Throughout my career, I have led and developed several individual and collaborative projects focused on software frameworks, signal processing tools, and web infrastructure. These projects reflect my commitment to building open, modular, and scalable solutions—from real-time neuroscience tools to developer frameworks and backend systems. Below is a selection of the most representative works I've designed, maintained, or released as open-source.

Chaski-Confluent
2022 - Present

chaski.dunderlab.com/ github.com/dunderlab/python-chaski

Designed and developed a distributed communication framework over TCP/IP featuring dynamic node discovery, subscription-based messaging, and real-time message routing. The system includes support for remote Python execution, TensorFlow Serving integration, and AI-driven message broadcasting.

Python | TCP/IP | SWARM API | Docker | Tensorflow | RPyC

Foundation
2022 - Present

github.com/dunderlab/python-dunerlab.foundation

Created a modular Python framework to build scalable and distributed systems. Provides utilities for data pipelines, inter-process communication, and infrastructure orchestration with an emphasis on flexibility and system decoupling.

Python | Docker | Distributed Systems | Modular Architecture

DOCS: Automated Sphinx Documentation Generation
2023 - Present

github.com/dunderlab/python-dunderlab.docs dunderlab-docs.readthedocs.io

Built a Python module to automate the generation of Sphinx documentation from Jupyter Notebooks using nbsphinx. Includes features such as automated README creation, HTML index generation, and seamless Docker and GitHub workflows integration.

Python | Sphinx | nbsphinx | Jupyter Notebooks | Docker | GitHub Workflows

BCI-Framework
2018 - 2022

docs.bciframework.org github.com/UN-GCPDS/bci-framework

Developed a modular framework for designing and running psychophysiological experiments with OpenBCI. Included real-time data visualization, distributed stimulus delivery, and signal processing tools for research workflows.

Python | Tornado | Matplotlib | Brython | Kafka | OpenBCI

OpenBCI-Stream
2018 - 2022

openbci-stream.readthedocs.io github.com/UN-GCPDS/openbci-stream

Created a high-level module for real-time EEG, EMG, and ECG data acquisition and streaming using the OpenBCI Cyton board, enabling distributed neuroscience experiments and analysis.

Python | Kafka | OpenBCI

Matplotlib-FigureStream
2019 - 2022

figurestream.readthedocs.io github.com/UN-GCPDS/matplotlib-figurestream

Built a lightweight backend to stream Matplotlib animations over the web, allowing real-time visualizations in distributed systems and remote monitoring tools.

Python | Matplotlib | Flask

Qt-Material
2019 - 2022

qt-material.readthedocs.io github.com/UN-GCPDS/qt-material

Designed and maintained a Material Design-inspired stylesheet for PyQt and PySide applications. Focused on visual consistency and improved UX across platforms.

Python | PySide | PyQt6 | CSS | QT

Radiant Framework
2019 - 2022

radiant-framework.readthedocs.io github.com/dunderlab/python-radiant$framework$

Engineered a Brython-based framework for building responsive web apps entirely in Python. Integrated frontend logic with Tornado for dynamic, reactive interfaces.

Python | Tornado | Brython

Pinguino project
2012 - 2015

pinguino.cc github.com/PinguinoIDE

Contributed to the development of an open-source electronics prototyping platform and IDE, supporting Microchip microcontrollers and aiming to simplify embedded system design.

Python | PySide | Michrochip

Languages

English ●●●○○
Spanish ●●●●●

Strengths

- Enthusiast
- Motivated
- Autonomous

Formation

currently	PhD in Automation Engineering, Universidad Nacional de Colombia
2022	MSc in Industrial Automation, Universidad Nacional de Colombia
2018	BSc in Electronic Engineering, Universidad Nacional de Colombia