Rodolfo Padilla

Rockville, MD | (301) 919-8943 | rodolfo.mac3@gmail.com

Computational Biologist & Full Stack Developer with 5 years of hands-on laboratory experience in microbiology and molecular biology, combined with 8 years of experience in machine learning, web development, and bioinformatics. Specialized in bridging the gap between biological research and software solutions through custom tool development, data pipeline automation, and ML model deployment. Experienced in GMP-regulated environments, containerized applications, and building scalable scientific software for research and production use.

Technical Projects & Portfolio

Projects & Portfolio - [Remote] @ https://portfolio-site-pi-vert.vercel.app/

Marker Finder - Python/Flask bioinformatics application automating biomarker discovery and primer design for gene expression datasets using NCBI APIs, Primer3, and visualization libraries. Features integrated PDF reporting for reproducible scientific workflows, containerized deployment, and RESTful API design.

Lab Inventory Management System - Full-stack Flask + SQLAlchemy application for laboratory inventory management with low-stock alerts, expiry tracking, CSV import/export capabilities, and containerized deployment. Implements GMP-compliant record keeping and audit trails.

TickID Hub - End-to-end ML pipeline for ecological image classification using PyTorch → ONNX conversion, deployed within an R Shiny web application using Docker containers. Features model performance monitoring, batch inference capabilities, and reproducible deployment workflows.

Vector-Borne Disease Modeling Platform - Developed stage-structured ODE models in R/deSolve to simulate Deer Tick population dynamics under varying environmental conditions for Montgomery County, MD. Identified critical host density thresholds for tick infection amplification with public health surveillance applications.

Professional Experience

Laboratory Assistant - [University of Oregon, Roy Lab]

- Supported large-scale fungal biodiversity project (CLIMUSH)
- Performed sample preparation, microscopy, and aseptic handling within GMP-aligned workflows and clean laboratory practices
- Prepared media and reagents according to standardized protocols

- Developed automated data processing pipelines in R and Python for ecological datasets

Software Developer - [New Frontier Data, Washington, DC]

- Collaborated on Python-based services and machine learning solutions for data analytics platform
- Created and deployed ML models using TensorFlow and PyTorch with performance optimization in production workflows
- Improved model usability, inference speed, and integration with existing data pipelines
- Gained experience in collaborative development workflows, code reviews, and agile methodologies

Internet Marketing Manager - [Potomac Holistics, Rockville, MD]

- Managed company website architecture, ensuring uptime, performance optimization, and POS system integration
- Led digital operations and database management, gaining experience in maintaining critical online services
- Implemented automated marketing workflows and data-driven decision-making processes

Data Collector - [Retail Data LLC, Germantown, MD]

- Conducted systematic in-store audits and data collection with accuracy validation protocols
- Developed quality control processes and data integrity verification workflows

Research Experience

Independent Research Proposal - [University of Oregon]

- Designed experimental protocols investigating Sca4/Sca2-mediated disruption of vinculin and actin remodeling in endothelial cells
- Integrated literature review with proposed molecular assays (PCR, immunofluorescence, cytoskeletal analysis)
- Developed structured research plans demonstrating protocol development, assay design, and critical analysis skills applicable to software requirement gathering and system design

Education

University of Oregon - [Eugene, OR]

Bachelor of Science in Biology, Minor in Chemistry (2022-2025)

Relevant Coursework: Biochemistry, Molecular Genetics, Organic Chemistry, Cell Biology, Bacterial-Host Interactions, Microbiology, Data Analysis/Visualization

Montgomery College - Rockville, MD (2020-2021)

Associate of Science in Biology

Technical Skills

Laboratory & Molecular Biology

- Aseptic Techniques: BSL-2 protocols, bacterial culture (liquid and solid media), cleanroom practices.
- Molecular Methods: PCR/qPCR, ddPCR, gel electrophoresis, sample purification, DNA/RNA extraction
- Analytical Instruments: HPLC, FPLC, microscopy
- Quality Systems: GMP-aligned workflows, cGMP-compliant documentation, equipment calibration and maintenance, CLIA
- Laboratory Management: Media/reagent preparation, inventory management, waste disposal protocols, LIMS

Programming & Software Engineering

- Languages: Python, R, JavaScript
- Web Frameworks: Flask, Django, Node.js, Next.js, React, Bootstrap, Shiny
- Scientific Computing: NumPy, Pandas, Matplotlib, Plotly, SciPy, Biopython
- Machine Learning: TensorFlow, PyTorch, ONNX, scikit-learn
- Bioinformatics: NCBI APIs, sequence analysis, biomarker discovery
- DevOps & Deployment: Docker, Kubernetes, CI/CD pipelines, container orchestration
- Cloud Platforms: Google Cloud Platform (GCP), Vercel, Render
- Version Control: Git, GitHub
- Testing: PyTest, Jest, unit testing

Data Analysis & Visualization

- Statistical Analysis: Hypothesis testing, experimental design, data modeling, reproducible pipelines
- Data Visualization: Publication-ready figures, interactive dashboards, scientific plotting
- Database Management: SQLAlchemy, PostgreSQL, data integrity, query optimization
- Workflow Automation: Automated reporting, data pipeline orchestration, batch processing

Professional Strengths

- Bilingual: Fluent in English and Spanish

- Scientific Communication: Technical writing, experimental procedure documentation, results presentation
- Problem-Solving: Critical analysis, troubleshooting complex systems, hypothesis-driven project design
- Collaboration: Cross-functional team experience, code reviews, agile methodologies, mentoring
- Quality Assurance: GLP/cGMP compliance, validation protocols, documentation standards
- Adaptability: Quick learning of new technologies, scientific methods, and industry practices

Core Competencies

- Computational Biology: Bioinformatics pipeline development, genomic data analysis, molecular modeling, ecological simulation, biomarker discovery automation
- Full-Stack Development: End-to-end web application development, RESTful API design, database architecture, user interface design, performance optimization
- Machine Learning Engineering: Model development and deployment, inference optimization, production monitoring, MLOps practices, scientific ML applications
- Scientific Software: Laboratory management systems, data analysis automation, reproducible research tools, scientific workflow optimization
- Quality & Compliance: GMP-regulated environment experience, documentation standards, validation protocols, audit trail implementation