Pedro Fontanarrosa

Multidisciplinary Researcher & Software Engineer in Synthetic Biology | pfontanarrosa@gmail.com | +1 530-277-7641 | Nevada City, US | fontanapink.github.io/Resume-PedroFontanarrosa/

Summary

Multidisciplinary researcher with extensive experience in computational/software engineering and biological sciences. Pioneered a novel computational method leveraging Hybrid NN to infer dynamics from experimental omics data. Developed Genetic Design Automation tools that processed over 10,000 experimental data points and achieved 95% prediction accuracy in dynamic modeling. Authored 32 publications, including 8 in high-impact journals.

Skills

- **Software Engineering**: Python, Java, C++, JavaScript, R, Git, GitHub, GitLab, CI/CD, Docker, Kubernetes, Google Cloud, TensorFlow, PyTorch, scikit-learn, MCP, WSL
- **Optimization & Operations Research**: CPLEX, Gurobi, Pyomo, Linear Programming, Nonlinear Programming, Integer Programming
- **Web Scraping**: Scrapy, Splash, Selenium
- **Probabilistic Modeling**: Gaussian Process Regression, Bayesian Machine Learning
- **Machine Learning & Data Science**: Artificial Intelligence, Deep Learning, Hybrid Neural Networks, Physics-Informed Neural Networks, Bayesian Inference, Gaussian Process Regression, Time Series Analysis, VAR Regression, Uncertainty Quantification, PyMC
- **Web Development**: HTML, Hugo, Jekyll
- **Databases**: SQL
- **High Performance Computing**: HPC, Parallel Computing, Cluster Computing, MPI, Job Scheduling, Distributed Computing

Work Experience

Computational Systems and Synthetic Biology Lab, University College London London, UK
Postdoctoral Researcher Jun 2023 — Present
- Developed MIMIC, a Python package for simulating, inferring, and predicting microbial community dynamics; published in Bioinformatics
- Implemented Gaussian Process regression for imputing missing time-series data in microbial abundance datasets
- Applied Bayesian inference with MCMC sampling to recover interaction matrices, achieving 87.48% stability across posterior samples
- Integrated multi-omic data to enhance model robustness and ecological insight
- Initiated development of hybrid Neural Networks using gray box modeling and PINNs for inferring microbial interactions, improving model interpretability and predictive performance
- Streamlined CI/CD pipelines for scalable and reproducible computational biology workflows

Genetic Logic Lab, University of Boulder Boulder, CO, USA
Postdoctoral Researcher Aug 2022 — Jun 2023
- Enhanced iBioSim functionalities for genetic circuit modeling
- Developed robust mathematical models for genetic design with 95% forecasting accuracy
- Collaborated with international research teams using cloud-based tools
- Authored 8 peer-reviewed publications during tenure
- Optimized simulation workflows resulting in a 15% improvement in accuracy

University of Utah Salt Lake City, UT, USA
Research Assistant (PhD Researcher) Aug 2019 — Aug 2022

COMBINE Standards Online
SBOL Editor Jan 2019 — Jan 2022

University of Utah Salt Lake City, UT, USA
Research Assistant (Master's Researcher) Aug 2017 — Aug 2019

Northlands School Buenos Aires, Argentina
Highschool Chemistry Teacher Jan 2015 — Jan 2017

Tarbut School Buenos Aires, Argentina
Science and Mathematics Teacher Jan 2014 — Jan 2015

Evolutionary Studies Laboratory, University of Buenos Aires Buenos Aires, Argentina
Research Assistant Jan 2010 — Jan 2014

Volunteering

Data-Centric Biological Design & Engineering Interest Group   Oct 2024 — May 2025
Organizer

Organized a monthly seminar series under the Alan Turing Institute's banner to leverage AI in advancing biological system engineering. Unites experts from computer science, biology, and engineering to address global challenges in sustainable manufacturing, healthcare innovation, and environmental impact.

Biohacking BA   Jan 2013 — Jan 2017
Volunteer Organizer

Organized talks, workshops, hackathons, and DIY projects to promote innovation in science, engineering, and synthetic biology.

University of Buenos Aires Biology Week   Jan 2010 — Jan 2012
Event Organizer

Coordinated the annual Biology Week to promote science careers among high school students.

Education

University of Utah   Aug 2019 — Aug 2022
Ph.D.
- 3.8/4.0

University of Utah   Aug 2017 — Aug 2019
Master's
- 3.67/4.0

University of Buenos Aires   Jan 2007 — Jan 2014
Licentiate
- 8.39/10.00

Profiles

GitHub
fontanapink
github.com/Fontanapink

ORCID
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orcid.org/0000-0002-0535-2684

Google Scholar
Pedro Fontanarrosa
scholar.google.com/citations?hl=en&user=UemPJnYAAAAJ

Research Gate
Pedro Fontanarrosa
www.researchgate.net/profile/Pedro_Fontanarrosa3?ev=hdr_xprf

LinkedIn
Pedro Fontanarrosa
www.linkedin.com/in/pedro-fontanarrosa-37372474/

Certifications

- **Data Science Bootcamp** : THE ERDŐS INSTITUTE
- **Machine Learning A-Z™: AI, Python & R + ChatGPT Bonus [2023]** : Udemy
- **Optimization with Python: Solve Operations Research Problems** : Udemy
- **Optimization with Python: Complete Pyomo Bootcamp A-Z** : Udemy
- **AI and Meta-Heuristics (Combinatorial Optimization) Python** : Udemy
- **Modern Web Scraping with Python using Scrapy Splash Selenium** : Udemy
- **Deployment of Machine Learning Models** : Udemy
- **Pyomo Bootcamp: Python Optimization from Beginner to Advance** : Udemy
- **Theory of Gaussian Process Regression for Machine Learning** : Udemy

Awards & Recognitions

- **Fulbright and Argentine Presidential Fellowship in Science & Technology**: Awarded to pursue a master's degree in the United States starting Fall 2017.
- **Research and Communication Excellency Award**: Recognized for excellence in research and communication under the 'Beca Estímulo' scholarship.
- **Beca Estímulo (Encouragement Scholarship)**: Supported research and development tasks in genetics and ecology.