Pedro Fontanarrosa TEST

Multidisciplinary Researcher & Software Engineer in Synthetic Biology | pfontanarrosa@gmail.com | +44 (756) 459 4770 | London, GB | fontanapink.github.io

Summary

Broadly skilled researcher with a strong foundation in computational/software engineering and biological sciences. I have extensive experience developing Genetic Design Automation (GDA) tools and mathematical models for genetic circuit design during my Master's and PhD research. As a postdoc at UCL, I am expanding into advanced machine learning algorithm development—designing custom Gaussian process regression kernels, applying Bayesian inference with VAR regression for time-series analysis, and developing physics-informed neural networks to infer biological system dynamics. I excel in remote, multidisciplinary collaborations.

Skills

- **Software Engineering**: Python, Java, C++, JavaScript, R, Git, GitHub, GitLab, CI/CD, Docker, Kubernetes, Google Cloud, TensorFlow, PyTorch, scikit-learn, pyomo
- **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
- **Data Science & Machine Learning**: Machine Learning, Artificial Intelligence, Data Analysis, Neural Networks, Physics-Informed Neural Networks, Bayesian Inference, VAR Regression
- **Writing**: LaTeX
- **Web Development**: HTML, Hugo
- **Databases**: SQL

Work Experience

Computational Systems and Synthetic Biology Lab, University College London — **London, UK**
Postdoctoral Researcher — Jun 2023 — Present
- Developing robust Python packages for genetic design automation and modeling inference
- Creating and adapting CI/CD pipelines for scalable computational biology workflows
- Applying and advancing machine learning (GP, VAR, NN) and Bayesian optimization algorithms to enhance predictive modeling and system design

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
- Collaborated with international research teams using cloud-based tools

University of Utah — **Salt Lake City, UT, USA**
Research Assistant (PhD Researcher) — Aug 2019 — Aug 2022
- Developed and refined computational models for genetic regulatory networks
- Supported experimental design with simulation-based predictions
- Collaborated on interdisciplinary projects in synthetic biology

COMBINE Standards — **Online**
SBOL Editor — Jan 2019 — Jan 2022
- Led weekly meetings to coordinate SBOL standard updates
- Facilitated community-driven revisions and improvements to SBOL
- Enhanced interoperability in synthetic biology data exchange

University of Utah — **Salt Lake City, UT, USA**
Research Assistant (Master's Researcher) — Aug 2017 — Aug 2019
- Contributed to the development of preliminary GDA tools
- Assisted in mathematical modeling of genetic circuits
- Engaged in interdisciplinary research in synthetic biology

Northlands School — **Buenos Aires, Argentina**
Highschool Chemistry Teacher — Jan 2015 — Jan 2017
- Developed lesson plans that enhanced student engagement in scientific topics
- Mentored students in chemical research projects

Tarbut School — **Buenos Aires, Argentina**
Science and Mathematics Teacher — Jan 2014 — Jan 2015
- Designed and implemented creative educational programs
- Coordinated school-wide science and math competitions

Evolutionary Studies Laboratory, University of Buenos Aires — **Buenos Aires, Argentina**
Research Assistant — Jan 2010 — Jan 2014
- Coordinated field expeditions and permit negotiations
- Managed statistical programs and databases
- Trained new laboratory members

Volunteering

Biohacking BA Jan 2013 — Jan 2017
Volunteer Organizer

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

- Organized hackathons for SBOL and FAIR data practices
- Coordinated interdisciplinary teams and managed remote collaboration

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.

Data-Centric Biological Design & Engineering Interest Group Jan 2023 — Present
Organizer

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

Education

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

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

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

Profiles

GitHub
fontanapink
github.com/Fontanapink

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

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

Projects

Synergistic Discovery and Design (SD2)
Genetic circuit design for extreme environments enabled by models extracted from petabyte+ perturbation analyses.
Jan 2018 — Jun 2022

SBOL Standard Contribution
Contributed to the development of SBOL, a free and open-source standard for representing biological designs.

iBioSim Development
Worked on iBioSim—a CAD tool for modeling, analysis, and design of genetic circuits supporting SBML and SBOL, including capabilities for multicellular and spatial models.

Advanced Machine Learning for Biological Systems
Developing and applying novel machine learning algorithms to model and predict the structure and dynamics of biological systems. Techniques include custom Gaussian process regression with covariance (kernel) designs, Bayesian inference with VAR regression for time-series analysis, and physics-informed neural networks for scalable inference with limited samples. Originally applied to microbial systems, these methods are generalizable to any biological system.

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.