# Pedro Fontanarrosa

## Multidisciplinary Researcher & Software Engineer in Synthetic Biology

Broadly skilled researcher with a strong foundation in both computational/software engineering and biological sciences. I have extensive experience in genetic circuit design, machine learning, and data science—demonstrated through contributions to SBOL and iBioSim as well as remote collaborative projects. Passionate about using modern software development practices and advanced analytical techniques to solve complex, multidisciplinary problems.


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## Work

### Computational Systems and Synthetic Biology Lab, College University London

Research Assistantship

Jan 2023 – Present

London, UK

Developing genetic design automation software, modeling and simulation of genetic regulatory networks, and designing genetic circuits for specific applications under the supervision of Prof. Chris Barnes. Actively collaborating with international teams using remote work tools (Slack, Zoom) and cloud services.

- Developed advanced GDA tools for iBioSim
- Pioneered novel modeling automation techniques
- Maintained and enhanced genetic parts repositories

### Genetic Logic Lab, University of Boulder

Research Assistantship

Jan 2017 – Jan 2023
Boulder, CO, USA

Conducted research in genetic design automation, GRN modeling, and simulation. Collaborated remotely with multi-disciplinary teams, applying CI/CD pipelines, cloud platforms, and modern ML frameworks.

- Advanced GDA tool development with iBioSim
- Implemented innovative remote collaboration practices
- Enhanced simulation and design of genetic regulatory networks

## Evolutionary Studies Laboratory, University of Buenos Aires

### Research Assistantship

Jan 2010 – Jan 2014
Buenos Aires, Argentina

Performed research in genetics and ecology, including maintaining Drosophila isogenetic lines, coordinating field expeditions, and contributing to scientific publications and technical reports.

- Coordinated field expeditions and permit negotiations
- Managed statistical programs and databases
- Mentored and trained new laboratory members

## University of Utah

### Graduate Teaching Assistant

Sep 2020 – Dec 2020
Utah, USA

Assisted in teaching Fundamentals of Biomedical Engineering II by leading discussion groups and grading assignments.

## Northlands School

### Highschool Chemistry Teacher

Jan 2015 – Jan 2017
Buenos Aires, Argentina

Taught chemistry and coordinated Extended Essays in chemical research for high school students.

## Tarbut School

### Science and Mathematics Teacher

Jan 2014 – Jan 2015
Buenos Aires, Argentina

Taught primary and high school science and mathematics; organized Mathematical Ingenious Olympiads.

## COMBINE Standards

SBOL Editor

Jan 2019 – Jan 2022

Online

Curated and maintained the SBOL standard for representing biological designs. Coordinated change proposals and supported software libraries for the synthetic biology community.

## Volunteer

### Biohacking BA

**Volunteer Organizer**

Jan 2013 – Jan 2017

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

**Event Organizer**

Jan 2010 – Jan 2012

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

## Education

### University of Utah

**Biomedical Engineering (Synthetic Biology Track)**

Jan 2019 – Jan 2022

Ph.D.

### University of Utah

**Bioengineering (Synthetic Biology Track)**

Jan 2017 – Jan 2019

Master

### University of Buenos Aires

**Biological Sciences (Genetics, Evolution and Ecology)**

Jan 2007 – Jan 2014

Licentiate

## Projects

### Synergistic Discovery and Design (SD2)

**Researcher** at **DARPA**

Jan 2018 – Jun 2022

research project

Genetic circuit design for extreme environments enabled by models extracted from petabyte+ perturbation analyses.

Synthetic Biology | Genetic Circuits | DARPA

### SBOL Standard Contribution

**Contributor** at **COMBINE Standards**
community project

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

SBOL | Synthetic Biology | Standard

### iBioSim Development

**Developer** at **Genetic Logic Lab**
research project

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.

iBioSim | SBML | SBOL | Genetic Circuits

## Awards

### Fulbright and Argentine Presidential Fellowship in Science & Technology

Awarded by **Argentine President's Cabinet & U.S. Embassy of Buenos Aires**
Jan 2017

Awarded to pursue a master's degree in the United States starting Fall 2017.

### Research and Communication Excellency Award

Awarded by **Ministry of Science and Technology, Argentinean government**
Jan 2015

Recognized for excellence in research and communication under the 'Beca Estímulo' scholarship.

### Beca Estímulo (Encouragement Scholarship)

Awarded by **University of Buenos Aires**
Jan 2011

Supported research and development tasks in genetics and ecology.

## Certificates

### Data Science Bootcamp

Issued by **THE ERDŐS INSTITUTE**
Jan 2023

### Machine Learning A-Z™: AI, Python & R + ChatGPT Bonus [2023]

Issued by **Udemy**
Jan 2023

### Optimization with Python: Solve Operations Research Problems

Issued by **Udemy**

### Optimization with Python: Complete Pyomo Bootcamp A-Z

Issued by **Udemy**

### AI and Meta-Heuristics (Combinatorial Optimization) Python

Issued by **Udemy**

### Modern Web Scraping with Python using Scrapy Splash Selenium

Issued by **Udemy**

### Deployment of Machine Learning Models

Issued by **Udemy**

### Pyomo Bootcamp: Python Optimization from Beginner to Advance

Issued by **Udemy**

### Theory of Gaussian Process Regression for Machine Learning

Issued by **Udemy**

## Publications

### Evaluating the Contribution of Model Complexity in Predicting Robustness in Synthetic Genetic Circuits

Published by **ACS Synthetic Biology**
Jan 2024

An analysis of how model complexity impacts the robustness of synthetic genetic circuits.

### Synthetic Biology Open Language (SBOL) Version 3.1.0

Published by **Journal of Integrative Bioinformatics**
Jan 2023

Describes the implementation and features of SBOL version 3.1.0 for standardized data exchange in bioengineering.

## Skills

### Software Engineering

Python | Java | C++ | JavaScript | R | Git | GitHub | GitLab

### Optimization & Operations Research

CPLEX | Gurobi | Pyomo

CI/CD Docker Kubernetes

Google Cloud TensorFlow

PyTorch scikit-learn pyomo

Linear Programming

Nonlinear Programming

Integer Programming

### Web Scraping

Scrapy Splash Selenium

### Probabilistic Modeling

Gaussian Process Regression

Bayesian Machine Learning

### Data Science

Machine Learning

Artificial Intelligence

Data Analysis Neural Networks

### Writing

LaTeX

### Web Development

HTML Hugo

### Databases

SQL

## Languages

### Spanish

Native

### English

Proficient

### Portuguese

Intermediate

### French

Beginner

## Interests

### Synthetic Biology

Genetic Circuit Design

Biomedical Engineering

Data Science

### Electronics & DIY

Arduino Electronic Projects