Emanuel Cura Costa

+54 9 (221) 561 3300
ecuracosta@gmail.com
ecuracosta
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Academic experience

Completed studies

2015 – 2022 **PhD in Biological Sciences Area**, *Facultad de Cs. Exactas – Universidad Naciona de La Plata (UNLP)*, La Plata, *Approved with special distinction.*

2007–2014 **Bachelor/MSc in Biotechnology and Molecular Biology**, *Facultad de Cs. Exactas – Universidad Naciona de La Plata (UNLP)*, La Plata, *7.12/10.*

Incompleted studies

2012–2013 **Bachelor/MSc in computer science**, *Facultad de Informática – Universidad Naciona de La Plata (UNLP)*, La Plata, *20%.*

Professional experience

Projects

2017–present **Lead Software Developer and Architect**, *Systems Biology Group (SysBio).*

Led the development of SysVert, a pioneering GUI-based Vertex model simulation software for cellular tissue studies and introduced a unique Voronoi and Delaunay triangulation method for detecting cell-absent regions.

- Conceptualization and fully development of a user-friendly GUI using PyQt, Qt Creator, complemented with advanced visualization capabilities through glumpy.
- Coding real-time, interactive Voronoi diagrams enabling users to dynamically draw, move and adjust cells.
- Integration of features for importing micrograph segmentations from image analysis tools and enabling automatic Voronoi diagram generation.
- Coding geometric and force computations.

April 2023 **Bio x AI Hackathon Winner – hackathon.bio**, *SVM Team.*

Winning first place in the Bio x AI hackathon with our project *ProteinBind*.

- Focusing on ML-driven bioinformatics for protein mutation analysis.
- Identifying how mutations alter function and which mutations can be pathogenic.
- Multimodal contrastive learning framework, inspired by the ImageBind model by MetaAI.
- Working with multiple databases.

2014–2021 **Researcher – Published on eLife**, *Systems Biology Group (SysBio).*

Explored the mechanisms of spinal cord regeneration in axolotls, focusing on the unique spatiotemporal patterns of ependymal cell proliferation post-amputation.

- Mathematical models formulation uncovering a developmental-like program.
- Spatiotemporal cell recruitment post-injury validation through experimental data, leveraging tools such as PyABC for Approximate Bayesian Computation and data analysis packages like NumPy, SciPy, and Pandas.
- Published findings producing visual representations using Matplotlib and Seaborn, contributing to the broader understanding of regenerative biology.

Miscellaneous

2016–2023 **Teaching**, *Universidad Nacional de La Plata (UNLP)*

- Head of practical work in the Biophysical Chemistry course. Part-time, 2021-2023.
- Certified Assistant in the Biophysical Chemistry course. Part-time, 2021.
- Student Assistant in the Biology course. Part-time, 2016-2021.

2022–2023 **App Developer**, *Programa de Gobierno, Políticas Públicas y Transformación Social (PIGOPP) – Universidad Nacional Arturo Jauretche (UNAJ)*

Developed a mobile application to streamline surveys.

- Design and implementation of a user-friendly mobile application using Kivy in Python.
- Engineering the app to logining and updating survey responses directly to the university's central database.
- Interdisciplinary teams collaboration, incorporating feedback from sociologists, political scientists and public administrators.

2020–2022 **Data and Social Analysis Specialist**, *Sistema de Información, Evaluación y Monitoreo de Programas Sociales (SIEMPRO).*

Engaged in producing socioeconomic information, and monitoring and evaluating social programs.

- Contributing to the construction of a dynamic national, provincial and local information system.
- Extensively working with multiple government databases, employing statistical methodologies for diverse analytical projects.
- Building interactive geographical visualizations.
- Led the comprehensive redesign and restructuring of the website.

2020 – 2021 **Web Scraping and translation volunteer**, *EndCoronavirus.org*

Assisted in a multi-disciplinary effort to combat COVID-19 by developing community-based solutions.

- Automated web scraper development to efficiently separate the content of web pages into blocks for seamless translation.
- Utilizing tools and libraries such as requests, urllib, bs4 and lxml.
- Supported the team in integrating translated content into the website.

Computer skills

	Level	Skill	Years	Comment
OS:	■■■■□	GNU/Linux	13	*Archlinux and Debian based*
Language:	■■■■■	Python	10	*Extensive project experience*
Packages:	■■■■■	Pandas	8	*Data analysis*
	■■■■□	SciPy	7	*Statistics and diverse math applications*
	■■■■■	NumPy	8	*Data and numerical analysis*
	■■■■■	Seaborn and matplotlib	8	*Data visualization*
	■■■□□	Beautiful Soup and Requests	4	*Web scraping*
	■■□□□	SQLAlchemy	4	*Limited project usage*
	■■■■□	PyQt and Qt Creator	3	*Major solo project*
	■■■□□	Glumpy	3	*Major solo project*
	■■■■□	OpenCV	3	*Image analysis*
	■■□□□	PyTorch, Keras and Scikit-learn	3	*Machine learning*
	■■■■□	Kivy	8	*App development*
Others:	■■■■□	git	6	*Extensive project experience*
	■■□□□	Hugging Face	3	*Personal projects mainly*
	■■□□□	Obsidian	1	*Already love it*
	■■■■■	IPython	8	*Extensive project experience*
	■■■■■	PyCharm	8	*Extensive project experience*

Languages

Spanish	Native
English	Advanced

Interests

Brewing	Founded a local brewery producing 2,000 liters/month during 8 years.
Basketball	Passionate about competing and team play.
Biking	Enjoy exploring and improving endurance.
Gaming	Engaging in strategic PC games, valuing team-based challenges.
Reading	Fascinated by philosophy and staying updated with scientific publications.
Learning	Insatiable curiosity; constantly seeking knowledge expansion.

EMANUEL CUNA COSTA