Emanuel Cura Costa

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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.*
Thesis titled: "*Tissue regeneration, a systems biology approach*"

2007–2014 **Bachelor/MSc in Biotechnology and Molecular Biology**, *Facultad de Cs. Exactas – Universidad Naciona de La Plata (UNLP)*, La Plata, *7.12/10.*
Thesis titled: "*Benznidazole: a reliable and efficient model for systems studied through molecular dynamics*"

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.
Detailed achievements:

- Conceptualized and fully developed A user-friendly GUI using PyQt, Qt Creator, complemented with advanced visualization capabilities through glumpy.
- Coded real-time, interactive Voronoi diagrams enabling users to dynamically draw, move and adjust cells.
- Integrated features for importing micrograph segmentations from image analysis tools and enabling automatic Voronoi diagram generation.
- Innovated a unique method for detecting cell-absent regions by Voronoi and Delaunay triangulations.
- Crafted advanced simulation controls, incorporating periodic boundary conditions, malleable cell properties, cell division and apoptosis.
- Coded on geometric and force computations.
- Employed object-oriented programming (OOP) principles to ensure modular, maintainable and scalable code structure.
- Seamlessly integrated libraries such as numpy, pandas, matplotlib, geopandas, shapely and pyqtgraph to extend software capabilities and enrich user experience.

2014–2021 **Main Researcher**, *Systems Biology Group (SysBio).*

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

- Developed mathematical models that uncovered a developmental-like program in spinal cord ependymal cells post-amputation.
- Validated the spatiotemporal cell recruitment post-injury through modeling and experimental data, leveraging tools such as PyABC for Approximate Bayesian Computation and data analysis packages like NumPy, SciPy, and Pandas.
- Published findings in eLife producing visual representations and plots 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 neighborhood surveys for families and individuals.
Detailed achievements:

- Designed and implemented a user-friendly mobile application using Kivy in Python to facilitate and standardize surveys.
- Integrated a secure login system to authenticate university personnel, ensuring the integrity and confidentiality of the collected data.
- Created a dynamic menu interface to seamlessly guide users through a series of survey questions and possible answers, enhancing data accuracy.
- Engineered the app to synchronize and update survey responses directly to the university's central database.
- Collaborated with interdisciplinary teams, incorporating feedback from sociologists, political scientists and public administrators to refine the app's functionalities.

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 to achieve improved living conditions and social justice.
Detailed achievements:

- Contributed to the construction of a dynamic national, provincial and local information system.
- Worked extensively with multiple government databases, employing statistical methodologies for diverse analytical projects.
- Assisted in building interactive geographical visualizations.
- Played an instrumental role in identifying populations with pressing social demands, assessing program coverage, measuring service accessibility and calculating poverty metrics.
- Rendered technical advice for social programs, provincial liaisons and international agreements.
- 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 and promoting them to various stakeholders including policy-makers, businesses and individuals.

Detailed achievements:

- Developed an automated web scraper to efficiently separate the content of web pages into blocks for seamless translation.
- Utilized tools and libraries such as requests, urllib, bs4, lxml, and deep_translator to facilitate the automation process.
- Collaborated in addressing challenges related to translation quotas to ensure accurate and timely content translation into multiple languages.
- Supported the team in integrating translated content into the website, enhancing accessibility for a global audience.

Computer skills

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

Languages

Spanish Native

English Advanced

Interests

Brewing	Operated a small brewery for 5 years producing 3,000 liters/month. Now, passionately crafting for friends, family and companions.
Basketball	Passionate about competing and team play. Deep love for the sport.
Biking	Enjoy touring and exploring; improving endurance, scenic views and engaging in deep conversations during rides.
Gaming	Engaging in strategic PC games, valuing team-based challenges.
Reading	Fascinated by philosophy, curious about diverse topics and keen on staying updated with recent scientific publications.
Learning	Driven by an insatiable curiosity; constantly seeking knowledge and understanding.

EMANUEL CUNA COSTA