SEBASTIÁN AYALA-RUANO

I am a young researcher and freelance data scientist. I have worked in **Bioinformatics** and **Cheminformatics** for **five years** at various laboratories. My current research interests are devoted to **Network Science** and **Machine Learning** for drug discovery. I am part of several research, open-science, and software development communities (ISCBSC, The Carpentries, Streamlit Creators, and Open Life Science). Moreover, I am involved in some initiatives to empower Bioinformatics in Ecuador and Latin America.

EDUCATION

2024 | 2022

MSc, Systems Biology

Maastricht University (UM) — Maatricht, the Netherlands

- **Scholarship**: UM Holland-High Potential Scholarship for students from outside the EU/EEA.

2020 | 2016

B.Eng., Biotechnology

Universidad San Francisco de Quito (USFQ) — Quito, Ecuador

- **Minor**: Software engineering.
- **GPA**: 3.78/4 (Magna Cum Laude) - second best score of the College of Biological and Environmental Sciences 2020 class.

WORK EXPERIENCE

Oct. 2022 | Apr. 2022

Data Science Consultant

Universidad de Las Américas — Quito, Ecuador

- Created a curated database of 50,000 herbarium records from tropical forest species of the Americas using web scraping and the Global Biodiversity Information Facility API.
- Developed machine learning classifiers to predict the phenological stages of the forest species using the herbarium records. The models had values greater than 90% on all the performance metrics, and they can be used to design conservation strategies of the tropical forest species.

2021

Research Assistant

Applied Signal Processing and Machine Learning Research Group - USFQ — Quito, Ecuador

- Created a method based on network science and similarity searching to explore the chemical space of antiparasitic peptides and discover new drugs (See details here).
- **Advisors**: Yovani Marrero-Ponce, Noel Pérez Pérez

2020 | 2017

Research Intern

Computational and Theoretical Chemistry Group - USFQ — Quito, Ecuador

- Identified binding specificity between repressor proteins and a transcriptional factor associated with the jasmonic acid pathway in *Arabidopsis thaliana* through molecular dynamics simulations and machine learning algorithms (See details here).
- **Advisor**: Miguel Angel Méndez Silva

2020 | 2018

Research Intern

Bio-Chemoinformatics Group - Universidad de Las Américas — Quito, Ecuador

- Understood the impact of horizontal gene transfer in the genome of *Streptomyces clavuligerus* using phylogenetics, and other bioinformatics tools (See details here).
- Proposed molecular mimicry between Zika envelope protein and human neuronal proteins through molecular dynamics and protein-protein interaction networks.
- **Advisors**: Vinicio Armijos, Yunierkis Perez

CONTACT

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SKILLS

Technical

Programming Languages: python, R, BASH, C++, Java

DevOps: GitHub, git, docker

Data Science: jupyter, python, R

Databases and Cloud: MySQL, PostgreSQL, Firebase, heroku

Languages

Spanish: Native

English: Advanced | C1 | TOEFL iBT 109

Korean: Basic

German: Basic

The source code is available at sayalaruano/cv.

Last updated on 2023-11-17.

View this CV online at sayalaruano.github.io/cv

2019

Research Intern

Tumor Metabolism and Therapeutic Oncology Laboratory - Gwangju Institute of Science and Technology

Gwangju, South Korea

- Performed density functional theory and molecular dynamics simulations to understand the impact of a mutation in the ZN domain of the CRBN protein (See details here).
- I continued working on this research project in my undergraduate thesis.
- **Advisors**: Miguel Angel Méndez Silva, Steve K. Cho

TEACHING EXPERIENCE

2021

Co-organizer and co-instructor of a Bioinformatics boot camp

RSG Ecuador and iGEM Ecuador

Virtual event

- I designed and taught most of the course material.
- This course covered the basics of Linux, terminal usage, text and file processing command line tools, Bash/AWK scripting with applications in Bioinformatics, and Git/GitHub.

2020

Undergraduate Teaching Assistant

Learning Center - USFQ

Virtual events

- Provided online mentorship of Biotechnology, Mathematics, and Systems Engineering subjects to undergraduate students that needed help.

2018 | 2016

Undergraduate Teaching Assistant

General Biology Laboratory - USFQ

Quito, Ecuador

- Graded reports, tests, and other homework from the course.
- Provided feedback and guidance to undergraduate students in topics of the course.

PUBLICATIONS

Peer reviewed journal articles

- Aguilera-Mendoza, L., **Ayala-Ruano, S.***, Martinez-Rios, F., Chavez, E., García-Jacas, C. R., Brizuela, C. A., & Marrero-Ponce, Y. (2023). *StarPep Toolbox: an open-source software to assist chemical space analysis of bioactive peptides and their functions using complex networks*. **Bioinformatics**, 39 (8), btad506. doi: doi.org/10.1093/bioinformatics/btad506
- **Ayala-Ruano S.**, Marrero-Ponce Y., Aguilera-Mendoza L., Pérez N., Agüero-Chapin G., Antunes A., Aguilar A. (2022). *Network Science and Group Fusion Similarity-Based Searching to Explore the Chemical Space of Antiparasitic Peptides*. **ACS omega**, 7 (50), 46012-46036. doi: doi.org/10.1021/acsomega.2c03398. Preprint: doi.org/10.26434/chemrxiv-2021-tgv69-v2.
- Oña-Chuquimarca, S., **Ayala-Ruano, S.**, Goossens, Pauwels, L., Goossens, A., Leon-Reyes, A., & Méndez, M. A (2020). *The molecular basis of JAZ-MYC coupling, a protein-protein interface essential for plant response to stressors*. **Frontiers in Plant Science**, 11, 1139. doi: 10.3389/fpls.2020.01139. This article was included in the Frontiers in Plant Science 2020 highlights e-book. doi: 10.3389/978-2-88966-723-9.
- **Ayala-Ruano, S.**, Santander-Gordón, D., Tejera, E., Perez-Castillo, Y., & Armijos-Jaramillo, V. (2019). *A putative antimicrobial peptide from Hymenoptera in the megaplasmid pSCL4 of Streptomyces clavuligerus ATCC 27064 reveals a singular case of horizontal gene transfer with potential applications*. **Ecology and Evolution**, 9 (5), 2602-2614. doi: 10.1002/ece3.4924.

Editorial journal articles

- Osorio-Mogollon C, Grentzinger V, Olguin-Orellana GJ, **Ayala-Ruano S.**, et al. (2023). *ISCB Student Council Symposium 2021, a virtual global venue: challenges and lessons learned*. **F1000Research**, 12(50). doi: 10.12688/f1000research.129945.1.
- **Ayala-Ruano S.**, Hernandez, F., Ortega, A., Infante, D., Carrascal, D., Sánchez-Luquez, K., & Puche-Quiñonez, R. (2022). *Highlights of the 1st Ecuadorian-Venezuelan Symposium of Young Researchers in Bioinformatics (1SEVJIB)*. **F1000Research**, 11(1086), 1086. doi: 10.12688/f1000research.125381.1.
- Castillo-Vilcahuaman, C., Valdivia C., Osorio-Mogollón C., Silva-Andrade, C., Puche, R., **Ayala-Ruano, S.**, Cuesta-Astroz, Y., Parra, G (2020). *4th ISCB Latin American Student Council Symposium: a virtual and inclusive experience during COVID19 times*. **F1000Research**, 9. doi: 10.12688/f1000research.28330.1.

Others

Ayala-Ruano, S.*, & Zurita, J. (2021). *HerrCompBioinfo: un recurso educativo de código abierto de herramientas computacionales para entusiastas de la Bioinformática*. doi: doi.org/10.5281/zenodo.5748335

*co-first author

SELECTED PRESENTATIONS

- *Contributing Guidelines and Codes of Conduct for Open Projects*. (2022). Expert talk. **6th cohort of Open Life Science** (See details here).
- *Exploring the chemical space of antiparasitic peptides and discovery of new promising leads through a novel approach based on network science and similarity searching*. (2022). Oral presentation. **International Society for Computational Biology Student Council Webinar series** (See details here).
- *HerrCompBioinfo: An open-source educational resource of computational tools for Bioinformatics enthusiasts written in Spanish*. (2022). Oral presentation. **4th cohort of Open Life Science Graduation** (See details here).
- *The molecular basis of JAZ-MYC coupling, a protein-protein interface essential for plant response to stressors*. (2021). Oral presentation. **6th Brazilian Student Council Symposium: Omics and Data Science** (See details here).
- *In silico detection of horizontal gene transfer in Streptomyces clavuligerus*. (2020). Oral presentation. **International Society for Computational Biology Student Council Webinar series** (See details here).
- *Structural changes due to a mutation in Cereblon might be a cause for intellectual disability*. (2019). Poster presentation. **Global Intern Program - Gwangju Institute of Science and Technology** (See details here).

HONORS AND AWARDS

2022 — **UM Holland-High Potential scholarship**
Maastricht University — Maatricht, the Netherlands
- The UM Holland-High Potential Scholarship programme offers 24 full scholarships of € 30,000 (including tuition fee waiver and monthly stipend) each academic year for highly talented students from outside the European Union (EU) who have been admitted to a master's programme at UM.

2021 — **Best oral presentation award**
6th Brazilian Student Council Symposium: Omics and Data Science — Virtual event

2021 — **"For more data on labor informality" innovation challenge award**
Datalat, PNUD Ecuador, UN Women Ecuador, and the International Labour Organization — Virtual event
- This competition searched for a technological solution to collect labor informality data in Ecuador. There were 39 proposals from 80 interdisciplinary teams (See details about the challenge here).

2020 | 2016 — **Chancellor's Honor List and Magna Cum Laude**
Universidad San Francisco de Quito — Quito, Ecuador
- These awards recognize students who have a GPA of 3.7/4 or higher.

2020 — **Third HPC Summer School Colombia: Bio and Data Science scholarship**
CyberColombia — Virtual event
- The scholarship covered registration expenses for the event.

2019 — **2nd RSG-Colombia Symposium travel award**
RSG Colombia — Ibagué, Colombia
- This award covered the travel expenses to attend the event.

2019 — **Global Intern Program scholarship**
Gwangju Institute of Science and Technology — Gwangju, South Korea
- The GIP awarded students with accommodation and a monthly stipend to cover living expenses for eight weeks. During this time, we were involved in a research project and received valuable training and mentoring.

LEADERSHIP AND SERVICE

Current | 2022

Streamlit creators program

Streamlit — Virtual

- I have created several web applications with the Streamlit Python package and became part of the community of creators.

Current | 2021

Open Life Science (OLS) program

Open Life Science — Virtual

- Leader of the HerrCompBioinfo project during the 4th cohort of the OLS program. We created an open-source educational resource of computational tools for Bioinformatics enthusiasts written in Spanish. Also, I learned how to create and manage open science and open source projects.
- I mentored a group in the 5th cohort of the OLS program to create a computer vision-based tool to improve cancer diagnosis in Cameroon. See details about this project here.
- I gave a talk about contributing guidelines and codes of conduct for open projects in the 6th cohort of OLS program.

Current | 2020

Regional Student Group (RSG) Ecuador

International Society for Computational Biology Student Council — Virtual

- Co-founder and current president of the RSG Ecuador. This group aims to create a long-lasting community of students and researchers residing in Ecuador that work on Bioinformatics.
- Co-chair of the 1st Ecuadorian-Venezuelan Symposium of Young Bioinformatics Researchers.
- Fellowship committee chair of the 17th Student Council Symposium.
- Contributed to the program and fellowships committees of the 4th ISCB Latin American Student Council Symposium.

2021

Saturdays.AI Quito 2021

Saturdays.AI Quito — Virtual event

- Led my group project, which was an early plant disease detector based on convolutional neural networks, trained to recognize two types of maize infectious diseases.(See details here).

Note: I have developed other personal projects related to data science, machine learning, drug discovery, and other topics (See details here).