


# SEBASTIÁN AYALA-RUANO

I am a focused and motivated young researcher that has worked in **Bioinformatics** for **four years** at different laboratories. **Phylogenetics** and **Structural Bioinformatics** have been the main topics of this research experience. However, my current interests are devoted to **Network Science**, **Complex Systems**, and **Machine Learning** for drug discovery. Moreover, I am involved in various initiatives to empower Bioinformatics in Ecuador and Latin America.


## EDUCATION

2020  
|  
2015


- **B.Eng., Biotechnology**  
Universidad San Francisco de Quito (USFQ)  Quito, Ecuador
  - **Minor:** Systems engineering.
  - **GPA:** 3.77/4 (Magna Cum Laude) - second best score of the College of Biological and Environmental Sciences 2020 class.
  - **Thesis:** Computational study of the structural changes of two Cereblon protein mutations using Molecular Dynamics and Quantum Mechanics ([manuscript](#) and [short presentation](#) in Spanish).
  - **Advisor:** [Miguel Angel Méndez Silva](#)

## RESEARCH EXPERIENCE


Current  
|  
2021

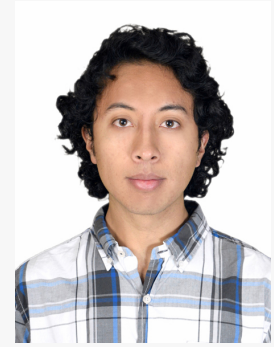
- **Applied Signal Processing and Machine Learning Research Group - USFQ**  
Research Assistant  Quito, Ecuador
  - We created a new method based on network science and similarity searching to discover new potential antiparasitic peptides (APPs). In brief, we explored the APPs' chemical space with three types of networks, predicted new potential leads using our best models, and found conserved motifs shared by our leads.
  - **Advisors:** [Yovani Marrero-Ponce](#), [Noel Pérez Pérez](#)

2020  
|  
2017

- **Computational and Theoretical Chemistry Group - USFQ**  
Undergraduate Researcher  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.
  - Proposed molecular mimicry between Zika envelope protein and human neuronal proteins through structural similarity predictors, Molecular Dynamics, and Protein-protein Interaction Networks.
  - **Advisor:** [Miguel Angel Méndez Silva](#)

2020  
|  
2018

- **Bio-Chemoinformatics Group - Universidad de Las Américas**  
Research Intern  Quito, Ecuador
  - Understood the impact of horizontal gene transfer in the genome of *Streptomyces clavuligerus* using Phylogeny, RNAseq data, and other bioinformatics tools.
  - Performed genomic comparative study of genes related to lignin degradation through Protein-protein Interaction Networks.
  - **Advisor:** [Vinicio Armijos](#)



## CONTACT

 [sayalaruano.github.io](https://sayalaruano.github.io)  
 [sebasar1245@gmail.com](mailto:sebasar1245@gmail.com)



## SKILLS

### Technical

Languages:



DevOps:



Data Science:



Databases and Cloud:



### Languages

Spanish: Native  
English: Advanced  
Korean: Basic

Made with the R package  
[pagedown](#).

The source code is available at  
[sayalaruano/cv](https://sayalaruano/cv).

Last updated on 2021-11-10.

View this CV online at  
[sayalaruano.github.io/cv](https://sayalaruano.github.io/cv)

- 2019 ● **Tumor Metabolism and Therapeutic Oncology Laboratory - Gwangju Institute of Science and Technology**  
 Research Intern 📍 Gwangju, South Korea
- Performed a computational study of a missense mutation from Cereblon protein using Molecular Dynamics and Quantum Mechanics simulations, and other bioinformatics tools.
  - **Advisors:** [Miguel Angel Méndez Silva](#), [Steve K. Cho](#)



## TEACHING EXPERIENCE

- 2021 ● **Linux and Bash/AWK scripting Boot Camp**  
[RSG Ecuador](#) and [iGEM Ecuador](#) 📍 Virtual event
- Co-organizer and co-instructor.
  - Designed and taught most of the [course material](#), which was held for five weeks.
  - 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

- 2021 ● **Exploring the Chemical Space of Antiparasitic Peptides and Discovery of New Promising Leads through a Novel Approach based on Network Science and Similarity Searching**  
 Preprint
- **Ayala-Ruano S**, Marrero-Ponce Y., Aguilera-Mendoza L., Pérez N., Agüero-Chapin G., Antunes A., Aguilar A. *ChemRxiv* (2021). doi: [10.33774/chemrxiv-2021-tgv69](https://doi.org/10.33774/chemrxiv-2021-tgv69).
- 2020 ● **4th ISCB Latin American Student Council Symposium: a virtual and inclusive experience during COVID19 times**  
 Editorial journal article
- Castillo-Vilcahuaman, C., Valdivia C., Osorio-Mogollón C., Silva-Andrade, C., Puche, R., **Ayala-Ruano, S.**, Cuesta-Astro, Y., Parra, G. *F1000Research* (2020). doi: [10.12688/f1000research.28330.1](https://doi.org/10.12688/f1000research.28330.1).
- 2020 ● **The molecular basis of JAZ-MYC coupling, a protein-protein interface essential for plant response to stressors**  
 Peer reviewed journal article
- Oña-Chuquimarca, S., **Ayala-Ruano, S.**, Goossens, Pauwels, L., Goossens, A., Leon-Reyes, A., & Méndez, M. A. *Frontiers in Plant Science* (2020). doi: [10.3389/fpls.2020.01139](https://doi.org/10.3389/fpls.2020.01139).
  - This article was chosen to feature in the Frontiers in Plant Science 2020 highlights e-book collection. doi: [10.3389/978-2-88966-723-9](https://doi.org/10.3389/978-2-88966-723-9).

- 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**  
Peer reviewed journal article
- Ayala-Ruano, S., Santander-Gordón, D., Tejera, E., Perez-Castillo, Y., & Armijos-Jaramillo, V. *Ecology and Evolution* (2019). doi: [10.1002/ece3.4924](https://doi.org/10.1002/ece3.4924).





## CONFERENCE PRESENTATIONS

- 2021 ● **The molecular basis of JAZ-MYC coupling, a protein-protein interface essential for plant response to stressors**  
[6th Brazilian Student Council Symposium: Omics and Data Science](#)  Virtual event
- Oral presentation ([slides](#) and [recording](#) in English).
- 2020 ● **Modeling of protein-protein interaction and search for key residues by machine learning of the JAZ-MYC3 complex of *Arabidopsis thaliana***  
[5th RSG-Argentine Symposium of Young Researchers in Bioinformatics](#)  Virtual event
- Oral presentation ([slides](#) and [recording](#) in Spanish).
- 2020 ● **In silico detection of horizontal gene transfer in *Streptomyces clavuligerus***  
[International Society for Computational Biology Student Council Webinar series](#)  Virtual event
- Oral presentation ([slides](#) and [recording](#) in English).
- 2019 ● **In silico detection of an antimicrobial peptide (AMP) transferred horizontally from arthropods to bacteria**  
2nd RSG-Colombia Symposium of young researchers in Bioinformatics  Ibagué, Colombia
- Oral presentation ([slides](#) in Spanish).
- 2019 ● **Modeling of Protein-protein interaction and search for key residues by machine learning of a protein complex in the jasmonic acid route in *Arabidopsis thaliana***  
XLIII National Biology Conference  Urcuquí, Ecuador
- [Poster presentation](#) in Spanish.
- 2019 ● **Structural changes due to a mutation in Cereblon might be a cause for intellectual disability**  
[Global Intern Program](#) at Gwangju Institute of Science and Technology  Gwangju, South Korea
- [Poster presentation](#) in English.



## HONORS AND AWARDS

- 2021 ● **Best oral presentation award**  
[6th Brazilian Student Council Symposium: Omics and Data Science](#)  Virtual event
- 2021 ● **Innovation challenge *For more data on labor informality* 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. This [blog](#) has a detailed explanation of the challenge.
  - The economic award of all stages of the competition was \$4.300

2020   2016	<ul style="list-style-type: none"> <li>● <b>Chancellor's Honor List</b> Universidad San Francisco de Quito <ul style="list-style-type: none"> <li>• This award recognizes students who have a GPA of 3.7/4 or higher.</li> </ul> </li> </ul>	📍 Quito, Ecuador
2020	<ul style="list-style-type: none"> <li>● <b>Third HPC Summer School Colombia: Bio and Data Science scholarship</b> <a href="#">CyberColombia</a> <ul style="list-style-type: none"> <li>• The scholarship covered registration expenses for the event.</li> </ul> </li> </ul>	📍 Virtual event
2020	<ul style="list-style-type: none"> <li>● <b>Saturdays.AI Quito 2020 scholarship</b> <a href="#">Saturdays.AI Quito</a> <ul style="list-style-type: none"> <li>• The scholarship covered registration expenses for the Saturdays.AI Quito 2021.</li> </ul> </li> </ul>	📍 Virtual event
2019	<ul style="list-style-type: none"> <li>● <b>2nd RSG-Colombia Symposium of young researchers in Bioinformatics travel award</b> RSG Colombia <ul style="list-style-type: none"> <li>• This award covered the travel expenses to attend the event.</li> </ul> </li> </ul>	📍 Ibagué, Colombia
2019	<ul style="list-style-type: none"> <li>● <b>Global Intern Program</b> Gwangju Institute of Science and Technology <ul style="list-style-type: none"> <li>• 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.</li> </ul> </li> </ul>	📍 Gwangju, South Korea



## LEADERSHIP AND SERVICE

Current   2020	<ul style="list-style-type: none"> <li>● <b>Regional Student Group Ecuador</b> <a href="#">International Society for Computational Biology Student Council</a> <ul style="list-style-type: none"> <li>• Co-founder and current president of the RSG Ecuador</li> <li>• This group aims to create a long-lasting community of students, professors, and researchers residing in Ecuador, capable of learning, teaching, and using technologies related to Bioinformatics.</li> </ul> </li> </ul>	📍 Quito, Ecuador
2021	<ul style="list-style-type: none"> <li>● <b>17th Student Council Symposium</b> <a href="#">International Society for Computational Biology Student Council</a> <ul style="list-style-type: none"> <li>• I was the fellowship committee chair and contributed to other organization tasks.</li> </ul> </li> </ul>	📍 Virtual event
2021	<ul style="list-style-type: none"> <li>● <b>Saturdays.AI Quito 2021 project leader</b> <a href="#">Saturdays.AI Quito</a> <ul style="list-style-type: none"> <li>• I led the project presented for my group at this event.</li> <li>• Our project was an early plant disease detector based on convolutional neural networks, trained to recognize two types of maize infectious diseases. More information about this project <a href="#">here</a>.</li> </ul> </li> </ul>	📍 Virtual event
2020	<ul style="list-style-type: none"> <li>● <b>4th ISCB Latin American Student Council Symposium</b> <a href="#">International Society for Computational Biology Student Council</a> <ul style="list-style-type: none"> <li>• I contributed to the program and fellowships committees.</li> </ul> </li> </ul>	📍 Virtual event