

# Sebastian Franco Ulloa, Ph.D.

## Data Scientist

With over 7 years of programming experience and a Ph.D. in biocomputational sciences, Sebastian specializes in developing pipelines to streamline and analyze large biomedical data sets. He has worked as a data scientist, bioinformatician and backend developer, honing his skills in industrial software development and project/team management. He thrives in spaces where he can learn new technologies and spar ideas with his colleagues. Sebastian approaches challenges with an analytical and compassionate mindset, actively seeking diverse perspectives to make well-informed decisions. He describes himself as a self-aware and determined individual with a sense of humor, while his peers see him as disciplined, goal-oriented and caring.

### Contact

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📍 Oslo, Norway

### Skills

Bioinformatics

Machine learning

Statistical analysis

Drug discovery and development

Data visualization

Scientific communication

Teaching

### </> Programming

Python

SQL

Typescript (React)

Docker

AWS

### 🗣 Languages

Spanish

English

Italian

Norwegian

### 📁 Work Experience

#### Senior Data Scientist - Consultant

*Oslo University Hospital - CellFIT. Norway.*

Now  
2023

Designed and implemented a Python web application to clean and analyze proteomics data. The pipeline leverages supervised AI methods to extract features and identify biomarkers that are predictive of clinical outcomes. Implemented front-end (Streamlit, Dash and React), database (PostgreSQL and SQLite), API (FastAPI) and parallelization (thread and multiprocessing) solutions to optimize the pipeline's performance. Led a team of 5 with agile methods (SCRUM).

#### Biomedical Outreach Representative

*Expert Analytics. Norway.*

Now  
2022

Represented Expert Analytics at Oslo Cancer Cluster and cultivated relationships with academic and industrial organizations in the biomedical sector. Secured 2 M NOK for the development of a proteomics data pipeline.

#### Senior Data Scientist and Backend Developer

*Edge Audio Analytics. Norway.*

2022  
2021

Analyzed terabytes of high-frequency audio data to detect anomalies and baseline variations. Developed and deployed ML/AI models to predict failures in heavy hydropower machinery. Maintained an AWS cloud infrastructure, including databases, long-term storage, roles and monitoring systems. Led a team of 7 with agile methods (SCRUM).

#### Researcher

*Italian Institute of Technology. Italy*

2021  
2017

Studied the interaction between drugs and biomolecules with ML/AI and statistical inference models, in Python. Participated in 4 drug discovery campaigns and identified hit compounds for different forms of cancer and bacterial infections. Authored 9 peer-reviewed publications and supervised 2 master's students.

### 🎓 Education

#### Ph.D. Biocomputational Sciences (*cum laude*)

2021 *Italian Institute of Technology. Italy.*

2017 *Thesis title: Multiscale Modeling of Metal Nanoparticles for Biotechnological Applications.*

#### BSc. Physics (GPA 3.59)

2017 *University of Los Andes. Colombia.*

2012 *Thesis title: Simulations of a Weakly Self-Interacting Fluid Using Lattice Boltzmann Methods (Graded 4.00/4.00).*

#### BSc. Chemistry (GPA 3.57)

2016 *University of Los Andes. Colombia.*

2011 *Thesis title: Application of Molecular Mechanics for the Discovery of Novel Microbial IIA Topoisomerases Inhibitors (Graded 4.00/4.00).*



## Scientific Publications

- 1 **(Cover article) Franco-Ulloa, S.**, Cesari, A., Riccardi, L., De Biasi, F., Rosa-Gastaldo, D., Mancin, F., De Vivo, M. & Rastrelli, F. Molecular Mechanisms Underlying Detection Sensitivity in Nanoparticle-Assisted NMR Chemosensing. **2023**. *J. Phys. Chem. Lett.* 14 (30): 6912-6918.
- 2 **(Cover article) Franco-Ulloa, S.**, Riccardi, L., Rimembrana, F., Grottin, E., Pini, M. & De Vivo, M. NanoModeler CG: A Tool for Modeling and Engineering Functional Nanoparticles at a Coarse-Grained Resolution. **2023**. *J. Chem. Theory Comput.* 19 (5): 1582-1591.
- 3 **(Cover article) Pecina, A.** Rosa-Gastaldo, D., Riccardi, L., **Franco-Ulloa, S.**, Milan, E., Scrimin, P., Mancin, F. & De Vivo, M. On the metal-aided catalytic mechanism for phosphodiester bond cleavage performed by nanozymes. **2021**. *ACS Catal.* 11 (14): 8736-8748.
- 4 **(Cover article) Franco-Ulloa, S.**, Guarnieri, D., Riccardi, L., Pompa, P. P. & De Vivo, M. Association mechanism of peptide-coated metal nanoparticles with model membranes: A coarse-grained study. **2021**. *J. Chem. Theory Comput.* 17 (7): 4512-4523.
- 5 **(Co-first author) Morillas-Becerril, L.**, **Franco-Ulloa, S.**, Fortunati, I., Marotta, R., Sun, X., Zanoni, G., De Vivo, M. & Mancin, F. Specific and nondisruptive interaction of guanidium-functionalized gold nanoparticles with neutral phospholipid bilayers. **2021**. *Commun. Chem.* 93: 4.
- 6 Mestizo, P. D., Narváez, D. M., Pinzón-Ulloa, J. A., Torres Di Bello, D., **Franco-Ulloa, S.**, Macías, M. A., Groot, H., Miscione, G. P., Suescun, L. & Hurtado, J. J. Novel complexes with ONNO tetradentate coumarin Schiff-base donor ligands: X-ray structures, DFT calculations, molecular dynamics and potential anticarcinogenic activity. **2020**. *Biomaterials.* 34: 119-140.
- 7 **Franco-Ulloa, S.**, Tatulli, G., Løland-Bore, S., Moglianetti, M., Pompa, P. P., Cascella, M., De Vivo, M. Dispersion state phase diagram of citrate-coated metallic nanoparticles in saline solutions. **2020**. *Nat. Comm.* 11: 5422.
- 8 Ortega, J. A., Arencibia, J. M., Minniti, E., Byl, J. A. W., **Franco-Ulloa, S.**, Borgogno, M., Genna, V., Summa, M., Bertozzi, S. M., Bertorelli, R., Armirotti, A., Minarini, A., Sissi, C., Osheroff, N. & De Vivo, M. Novel, potent, and druglike tetrahydroquinazoline inhibitor that is highly selective for human topoisomerase II  $\alpha$  over  $\beta$ . **2020**. *J. Med. Chem.* 63 (21): 12873-12886.
- 9 Arencibia, J. M., Brindani, N., **Franco-Ulloa, S.**, Negro, M., Kuriappan, J. A., Ottonello, G., Bertozzi, S. M., Summa, M., Giroto, S., Bertorelli, S., Armirotti, A. & De Vivo, M. Design, synthesis, dynamic docking, biochemical characterization, and in vivo pharmacokinetics studies of novel topoisomerase II poisons with promising antiproliferative activity. **2020**. *J. Med. Chem.* 63 (7): 3508-3521.
- 10 **(Cover article) Franco-Ulloa, S.**, Riccardi, L., Rimembrana, F., Pini, M. & De Vivo, M. NanoModeler: A webserver for molecular simulations and engineering of nanoparticles. **2019**. *J. Chem. Theory Comput.* 15 (3): 2022-2032.
- 11 Torres, J. F., Macías, M. A., **Franco-Ulloa, S.**, Miscione, G. P., Cobo & J., Hurtado, J. J. Cu(II) and Zn(II) complexes with dinitrobenzoates and pyrazolyl ligands: structural and thermal stability influence of N-H moiety. **2019**. *Crystal Growth and Design.* 19 (6): 3348-3357.
- 12 **Franco-Ulloa, S.**, La Sala, J., Miscione, G. P. & De Vivo, M. Novel bacterial topoisomerase inhibitors exploit Asp83 and the intrinsic flexibility of the DNA gyrase binding site. **2018**. *Int. J. Mol. Sci.* 19 (2): 453.
- 13 **Franco-Ulloa, S.**, Ramos-Guzmán, C. A. & Miscione, G. P. The evolution of drug design and the role of computational methods: Playing to be God. **2016**. *Hipótesis.* 21: 40-49.

## Oral and Poster Scientific Presentations

- 1 Invited speaker at the **Intelligent Health Conference**. 2024. *Norway*.
- 2 Speaker at the **Properties and Functionalities of Nanometer and Sub-Nanometer Sized Quantum Objects Gordon's Research Conference**. 2019. *Switzerland*.
- 3 Poster presentation at the **New Perspectives of Nanostructured Devices and High-Resolution Characterization Techniques Gordon's Research Seminar**. 2019. *Switzerland*.
- 4 Poster presentation at the **Nucleic acid immunity: from cellular mechanisms to new technologies SIBBM seminar**. 2019. *Italy*.
- 5 Speaker at the **Challenges in modelling and simulations of nanoparticles in complex environments CECAM workshop**. 2019. *Italy*.
- 6 Poster presentation at the **Translational and Health Informatics: Implications for Drug Discovery EuroQSAR Symposium**. 2018. *Greece*.
- 7 Poster presentation at the **Multiscale modelling in electrophysiology: from atoms to organs CECAM workshop**. 2018. *Switzerland*.
- 8 Poster presentation at the **1st Protein Structure, Function, and Drug Discovery School**. 2017. *Colombia*.
- 9 Speaker at the **42nd Theoretical Chemists of Latin Expression Congress**. 2016. *Uruguay*.
- 10 Speaker at the **6th National Congress of Theoretical and Computational Chemists**. 2016. *Colombia*.
- 11 Speaker at the **2nd Colombian Congress of Biochemistry and Molecular Biology**. 2016. *Colombia*.

## Volunteering

- Now  
2019 • **Peer Reviewer**  
*Journal of Chemical Theory and Computation*  
Review one manuscript per month on computational biology and assess their potential for publication.
- 2021  
2020 • **Teacher**  
*Fundación para la Equidad Equitativa. Colombia*  
Designed a year-long introductory Python course targeting high school students in remote areas of Colombia with limited internet access. Provided slides and recorded teaching sessions.
- 2021  
2020 • **Quiero Mentoría ("I Want Mentorship") Program**  
*Uniandinos - Alumni Association. Colombia*  
Provided mentorship to 2 undergraduate mentees for a total of 6 hours per month and assisted them in their transition to a professional working environment or postgraduate programs.
- 2015  
2013 • **Board Member at the Student's Council**  
*University of Los Andes. Colombia*  
Participated in the final decision-making process for students' academic and disciplinary matters, involving approximately ten cases per week.
- 2013  
2012 • **Teacher/Fundraiser**  
*SOSAndes - Students Offering Support. Colombia*  
Raised ca. 300€ giving physics classes to build shelters for underprivileged communities in Colombia.