Sebastian Franco Ulloa, Ph.D. Biocomputational Scientist

I am a consultant at Expert Analytics AS, where I have fulfilled roles as a researcher in bioinformatics, senior data scientist and backend software developer. I hold a Ph.D. in biocomputational sciences and have a background in physics and chemistry, complemented by a passion for teaching. My interests span biostatistics, machine learning/artificial intelligence, and immunology. My values are rooted in the scientific method and critical thinking. I approach challenges with an analytical and compassionate mindset, actively seeking diverse perspectives to form well-informed and rational judgments. I describe myself as a self-aware, determined individual with a sense of humor.

Contact

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دیک 🚯 Skills

Bioinformatics

Drug discovery and development

Machine learning

- Statistical analysis
- Data visualization
- Scientific communication

Teaching

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Python

Bash

LaTeX

Git

- Docker
- AWS

Languages

Spanish

English

Italian

Work Experience

Senior Data Scientist

Oslo University Hospital - CellFiT. Norway.

Now 2023 Designed and implemented a Python-based web application to load, clean, visualize and analyze mass cytometry data. The pipeline also leverages supervised machine learning methods for feature extraction and prediction of clinical outcomes.

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 at notable European gatherings like Cancer Crosslinks 2023 and the Nordic Precision Medicine Forum 2023.

Senior Data Scientist and Backend Developer

Edge Audio Analytics. Norway.

2022 Analyzed terabytes of high-frequency audio data to detect anomalies and baseline variations. Developed predictive maintenance models for heavy hydropower machinery. Contributed to a federated learning product. Led an 8-people team utilizing the SCRUM framework.

Part-time Professor

University of Los Andes. Colombia.

2016
2016
2016
Trained undergraduate students in analytical chemistry and laboratory best practices. Graded over 50 assignments per week including lab reports, quizzes, and exams.
Grade from students: 3.72/4.00

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)

Other Work Experience

Guest Researcher

2019

2018

2016

2013

2019

2016

2011

Hyllerås Centre for Quantum Molecular Sciences. Norway.

Conducted coarse-grained and hybrid particle-field molecular dynamics to investigate polymer aggregation. Gained proficiency in Python for data processing and analysis.

Research Intern

2016
 2016
 2016
 Participated in a drug discovery campaign for novel antimicrobial agents. Conducted molecular dynamics simulations and performed free energy calculations.

Teaching Assistant

University of Los Andes. Colombia

Imparted 3-hour weekly lectures to 20+ students as a complement to the main sessions of various courses, including Quantum Chemistry, Computational Chemistry, and Physical Chemistry II.

Other Education

Certified Courses on Data Science

2020 DataCa

DataCamp

Career tracks on machine learning (93 hours), data science (100 hours), and Python programming (52 hours).

Certified Online Course on Leadership and Innovation

MIT Professional Education

2020 2020 Completed a 40-hour course covering key digital transformation technologies: AI, blockchain, IoT, cloud computing and cybersecurity. Coordinated three discussion forums, three reflection essays and two exams with other participants around the world

Modern Physics at All Scales Summer School

Leiden University. The Netherlands.

Program for undergraduate students to explore various research disciplines and applied physics under the guidance of leading experts. It included talks, hands-on lab tours and cultural events.

Special Achievements

Full scholarship from Becas Santander to enroll in an online course from the *Massachusetts Institute of Technology (MIT)*. The scholarship covered the enrollment fee of \$2,300 of the MIT - Leading Digital Transformation certified course.

 Winner of the research grant HP10CR7KHL from the Italian SuperComputing Resource Allocation-Class C (ISCRA-C). Earned 25,000 core hours from the SuperComputing Applications and Innovation (SCAI) center.

Familiar Programming Tools

Scikit-learn TensorFlow (Keras) Streamlit Scipy Seaborn Pandas Matplotlib Bokeh Numpy AWS S3 **DynamoDB** IoT Core Lambda

CloudWatch

CodePipeline

Boto3

Scientific Software >>>>>

Gromacs

Schödinger Drug Discovery Suite

VMD

PostgreSQL TimeScaleDB GitHub Actions p5.js JupyterLab VSCode

Scientific Publications

(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.

(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.

(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.

(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.

(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.

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. *Biometals*. 34: 119-140.

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.

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 α over β. 2020. J. Med. Chem. 63 (21): 12873-12886.

Arencibia, J. M., Brindani, N., Franco-Ulloa, S., Negro, M., Kuriappan, J. A., Ottonello, G., Bertozzi, S. M.,
 Summa, M., Girotto, 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.

(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.

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.

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.

i Oral and Poster Scientific Presentations

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

🖐 Volunteering

Peer Reviewer

Now Journal of Chemical Theory and Computation - Impact factor 6.006

Review ca. 2 manuscripts per month on computational biology and assess their potential for publication.

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.

Quiero Mentoría ("I Want Mentorship") Program

2021

2021

- 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.

Board Member at the Student's Council

University of Los Andes. Colombia

2015 2013

Participated in the final decision-making process for students' academic and disciplinary matters, involving approximately ten cases per week.

2013 **Teacher/Fundraiser**

SOSAndes - Students Offering Support. Colombia
 Raised ca. 300€ giving physics classes to build shelters for underprivileged communities in Colombia.