Giorgia Del Missier

London
+44 7923892819
delmissiergiorgia@gmail.com
/gioodm.github.io
/giorgia-del-missier
/gioodm

Experience

Imperial College London (Ledesma-Amaro Synthetic Biology group) London, UK
Computational biologist (contract researcher) Sep. 2023 – Present

My research lies at the intersection of bioengineering, structural biology, and machine learning. Currently, I'm working on several projects, including:

- identifying methods to apply AI for the development of sustainable food proteins
- using *in-silico* directed evolution to improve the functionality of enzymes relevant for bioproduction
- optimising neural network models for bacterial promoter prediction using Keras and PyTorch
- participating in the selection, evaluation, and interview process of new candidates for internships and collaborations
- supervising and mentoring of students for computational projects, providing guidance and support to enhance their research skills and project outcomes

Computational biologist (internship) Nov. 2022 – Jun. 2023

During my internship research at the Ledesma-Amaro group, I designed and developed a novel pipeline to perform protein functional annotation using AlphaFold-predicted structural models. Tasks included:

- algorithm design, and Python and Unix scripting, optimising code for speed and efficiency through parallel programming techniques
- use of state-of-the-art structural and sequence alignment tools to enable a comprehensive analysis at a whole-proteome level
- use of REST APIs for web scraping to extract valuable data from bioinformatics databases
- use of network analysis, statistical testing and enrichment techniques for protein function inference
- design and execution of benchmark analyses to assess pipeline performance
- communication of findings through presentations and reports, ensuring accessibility and clarity for all team members
- drafting manuscript for scientific publication *(in review)*

Maastricht Center for Systems Biology Maastricht, NL
Lab technician (internship) Jun. 2021 – Sep. 2021

My goal was to functionally validate proteins associated with mitochondrial dynamics mechanisms, as predicted through computational models. Lab activities included:

- PCR and quantitative PCR assays
- construction of esiRNAs
- molecular cloning and Gibson assembly techniques
- write and present weekly reports on experimental procedures and findings to the rest of the team
- manage lab resources and supplies to optimise inventory levels

IRCSS Institute of Neurological Sciences Bologna, IT
Bioinformatician (internship) Nov. 2020 – Apr. 2021

I worked in the Neurogenetics lab, which focuses on identification of the molecular basis and pathogenic mechanisms of mitochondrial neurological diseases. My activities included:

- examination of Whole-Exome Sequencing data for a cohort of 64 patients with hereditary optic neuropathies
- design and implementation of Python, R and Unix scripts for fast and streamlined analysis of Next Generation Sequencing data
- evaluation and use of phenotype-driven tools for variant prioritisation, with the aim of identifying new genetic markers of disease
- use of software tools in conjunction with relevant databases for genomics data exploration and variant analysis
- preparation of regular reports to communicate findings to a multidisciplinary team

Skills

Programming languages Python (advanced), R (advanced), Unix (advanced) and MATLAB (intermediate); experience with Linux, MacOS, Windows and HPC platforms

Developer tools version control with Git and GitHub; web development with HTML/CSS markup and Python DASH; experience with REST APIs for data retrieval and integration; Neo4j graph database management system and Cypher query language

Scientific expertise Machine Learning (supervised and unsupervised learning, model building and optimisation, feature selection, regression and classification tasks - R, Python scikit-learn); Data cleaning (Pandas, NumPy, SciPy) and visualisation (Matplotlib, Plotly, Seaborn); Mechanistic Modeling (ODEs, PDEs, agent-based, constraint-based); Omics data analysis (BLAST, SAM and BAMtools, bcftools, plink, BioConductor, IGV, R limma, Cytoscape); Structural biology (AlphaFold, ChimeraX); Linear and Non-Linear Dynamical systems

Productivity software LaTeX, Microsoft Office tools (Word, Excel, PowerPoint)

Education

Maastricht University Maastricht, NL
MSc Systems Biology Sep. 2021 – Jul. 2023

- Final grade: GPA: 8.5/10, *cum laude*
- Dissertation title: “WASP: A new Pipeline for Functional Annotation of Proteins using AlphaFold Structural Models”
- Modules included: Systems Biology, Modelling Biosystems, Dynamic Game Theory, Dynamical Systems and Non-Linear Dynamics, Network Biology, Machine Learning and Multivariate Statistics

Alma Mater Studiorum - University of Bologna Bologna, IT
BSc Genomics Sep. 2017 – Mar. 2021

- Final grade: 110/110, *with honours*
- Dissertation title: “Phenotype-driven Variant Prioritisation Tools: Analysis of Whole Exome Sequencing in Patients with Hereditary Optic Neuropathy”
- Modules included: Bioinformatics, Programming, Statistics and Data Science, Molecular Biology and Genetics, Epigenomics, Metagenomics, Metabolomics, Proteomics and Structural Biology