Nils **Giordano**

Research / Data Scientist · Computational Systems Biologist

Nantes, France

www.normalesup.org/~giordano/ | nigiord | nils-giordano | Nils Giordano

Research Scientist with 6 year of experience in the analysis and modeling of biological datasets

NGS analysis – single-cell Multi-Omics – Data Science – Mathematical Modeling

Skills

Bioinformatics	Single-cell Multiomics (10x Genomics), Metagenomics/transcriptomics (Illumina), Genome binning/annotation (EggNOG/KO), Metabolic reconstruction/modeling (CarveMe, Cobra), Scripting (R/Python/Bash), Version control (Git), Pipeline design, Cluster/Cloud computing (SGE/Slurm, AWS)
Biomathematics	Network analysis, Optimal control, Metabolic modeling (FBA/FVA), Linear/non-linear dynamical systems, Time-series analysis (Kalman filtering/smoothing), Image analysis (segmentation/tracking), Sensitivity analysis
Wet lab	Cloning (molecular design, overlap PCR, Gibson assembly), Chromosome editing (electroporation, lambda-red recombineering), Microplate reader, Fluorescence microscope, Microfluidic
Languages	French (native), English (fluent), Italian (basic)

Experience

Postdoctoral Researcher

Nantes, France

INSERM – CRCI^{2}NA, Nantes - Angers Cancer and Immunology Research Center — *Since Jan. 2023*

Mentor: Dr. Éric Letouzé (team ICAGEN, CRCI^{2}NA, INSERM).

- Integrate whole-genome and single-cell multiomic datasets from a cohort of 40 multiple myeloma patients.
- Identify features for patient stratification and treatment susceptibility.
- Develop, maintain, and deploy pipelines for the analyses of single-cell multiomic data.
- Design integration strategies to uncover tumor clonal history from genetic, epigenetic and functional data.

Research Scientist / Data Scientist (Industry position)

Paris, France

Integrative Phenomics, a French R&D company on human microbiome health — *Apr. 2020 - Jun. 2022*

Collaborator: Dr. Eugeni Belda (Data Scientist, Integrative Phenomics)

- Developed pipelines for NGS analysis of gut metagenomic data and deployed them on the cloud.
- Designed and implemented an innovative modeling platform to predict how food metabolites interact with a patient's microbiote.
- Analyzed blood and stool metabolomics data to validate model predictions.
- Produced regular scientific reports, co-wrote publications, and animated internal/external meetings.
- Co-wrote public grant applications and gave multiple scientific presentations in front of the press and investors.

Postdoctoral Researcher

Nantes, France

CNRS – Université de Nantes, Laboratory of Digital Sciences of Nantes — *Jan. 2018 - Dec. 2019*

Mentor: Dr. Samuel Chaffron (team COMBI, LS2N, CNRS).

- Developed pipelines for NGS analysis of ocean metaomics data and deployed them on a cluster.
- Implemented network reconstruction/clustering methods on Tara expeditions metagenomic and metatranscriptomic datasets.
- Implemented metabolic reconstruction/simulation methods on communities of co-active and co-occurring microbes.
- Co-wrote and obtained a public grant for a 6-month extension of a Postdoc fellowship.
- Co-wrote publications and talked at multiple scientific events.

Research and Teaching Assistant, PhD Student

Grenoble, France

Inria – Université Grenoble Alpes, Project-team Ibis & Laboratoire Interdisciplinaire de Physique — *Sep. 2012 - Mar. 2017*

Supervisors: Dr. Hidde de Jong (Project-team Ibis, Inria) & Pr. Johannes Geiselmann (team BIOP, LIPhy).

- Constructed an abstract mathematical model of nutrient allocation in microorganisms.
- Applied Optimal Control methods to predict optimal nutrient allocations during an environmental change.
- Compared the identified optima with known regulatory processes of nutrient allocation in E. *coli*.
- Validated the predicted optima by engineering bacteria with fluorescent ribosomes and monitoring them in a microfluidic device.
- Wrote an extensive thesis manuscript, co-wrote publications, and talked at multiple scientific events.

Internships

Research Assistant, Intern

Grenoble, France

Inria – Sensitivity analysis for a complex model of the gene expression machinery in E. *coli* — *Feb.-Jun. 2012*

Supervisors: Dr. Hidde de Jong & Dr. Delphine Ropers (Project-team Ibis, Inria).

Research Assistant, Intern — *Cambridge, United Kingdom*

University of Cambridge – Theoretical study of the evolution towards multicellularity in microalgae — *Feb.-Jun. 2011*

Supervisor: Pr. Raymond E. Goldstein (Department of Applied Mathematics and Theoretical Physics).

Research Assistant, Intern — *Paris, France*

École Normale Supérieure – Dynamical responses of oscillating yeast cell suspensions to periodic forcing — *Jun.-Jul. 2010*

Supervisor: Dr. Silvia de Monte (Eco-evolutionary Mathematics, IBENS).

Publications

Single-Cell Data Reveal Heterogeneity of Resource Allocation across a Bacterial Population
Pavlou, A., Cinquemani, E., Pinel, C., Giordano, N., Van Melle Gateau, M., Mihalcescu, I., Geiselmann, J., Jong, H.,
Submitted (Mar. 2024). 2024

Genome-Scale Community Modelling Reveals Conserved Metabolic Cross-Feedings in Epipelagic Bacterioplankton Communities
Giordano, N., Gaudin, M., Trottier, C., Delage, E., Nef, C., Bowler, C., Chaffron, S.,
Nature Communications 15.1 (Mar. 2024) p. 2721. 2024

Acquired Resistance to a GPRC5D-directed T-cell Engager in Multiple Myeloma Is Mediated by Genetic or Epigenetic Target Inactivation
Derrien, J., Gastineau, S., Frigout, A., Giordano, N., Cherkaoui, M., Gaborit, V., Boinon, R., Douillard, E., Devic, M., Magrangeas, F., Moreau, P., Minvielle, S., Touzeau, C., Letouzé, E.,
Nature Cancer 4.11 (Nov. 2023) pp. 1536–1543. 2023

Characterization of the Gut Microbiota in Individuals with Overweight or Obesity during a Real-World Weight Loss Dietary Program: A Focus on the Bacteroides 2 Enterotype
Alili, R., Belda, E., Fabre, O., Pelloux, V., Giordano, N., Legrand, R., Bel Lassen, P., Swartz, T. D., Zucker, J.-D., Clément, K.,
Biomedicines 10.1 (Jan. 2022) p. 16. 2022

Mathematical Modelling of Microbes: Metabolism, Gene Expression and Growth
de Jong, H., Casagranda, S., Giordano, N., Cinquemani, E., Ropers, D., Geiselmann, J., Gouzé, J.-L.,
Journal of The Royal Society Interface 14.136 (Nov. 2017) p. 20170502. 2017

Dynamical Allocation of Cellular Resources as an Optimal Control Problem: Novel Insights into Microbial Growth Strategies
Giordano, N., Mairet, F., Gouzé, J.-L., Geiselmann, J., Jong, H.,
PLOS Computational Biology 12.3 (Mar. 2016) e1004802. 2016

Dynamical Responses of Oscillating Yeast Cell Suspensions to Periodic Forcing.
Giordano, N., D'Ovidio, F., Danø, S., Sø rensen, P. G., De Monte, S.,
Journal of Computational Interdisciplinary Sciences 3.2 (2012) pp. 77–86. 2012

Education

2017 **PhD, Systems Biology**, Université Grenoble Alpes — *Grenoble, France*
- Title – Microbial growth control in changing environments: Theoretical and experimental study of resource allocation in *Escherichia coli*
- Supervisors – Dr. Hidde de Jong & Pr. Johannes Geiselmann
- Labs – Project-team Ibis (Inria Grenoble – Rhône-Alpes) and team BIOP (Laboratoire Interdisciplinaire de Physique)

2009-13 **ENS Diploma, Life sciences**, École Normale Supérieure — *Paris, France*
French leading research school (*Grande École*), selected via a national competitive exam (*normalien*)

2012 **MSc, Cell Systems Biology**, École Normale Supérieure & Université Pierre et Marie Curie — *Paris, France*

2010 **BSc, Life sciences**, École Normale Supérieure & Université Pierre et Marie Curie — *Paris, France*

Trainings

2015 **Writing of a scientific paper**, 10 h — *Grenoble, France*

2015 **Team work and management: animation and communication**, 21 h — *Grenoble, France*

2014 **Time management and personal organization**, 14 h — *Grenoble, France*

2013-16 **Diverse trainings on multiple aspects of teaching and communication**, 70 h — *Grenoble, France*

Teaching

Angers Bioinformatic Summer School — *Angers, France*

Invited teacher (1/2 day) — *Jul. 2018*
- Lecture and training on Environmental Genomics for PhD students and young scientists, in collaboration with Dr. Samuel Chaffron.

Ecole Normale Supérieure — *Paris, France*

Invited teacher (3 x 1 day) — *Sept. 2013 – Aug. 2016*
- Lecture and training on modeling and simulation of genetic regulatory networks for MSc students, in collaboration with Dr. Hidde de Jong.

Université Grenoble Alpes *Grenoble, France*

Teaching assistant (211 hours) *Sept. 2013 – Aug. 2016*

- Bioinformatics: from genome analysis to modeling (BSc)
- Population genetics, conservation biology, biodiversity and evolution (BSc and MSc)
- Prokaryotic genetics and microbiology (BSc)

Extracurricular Activity

Sports	Outdoor/indoor climbing and bouldering (6A outdoor, 6B/C indoor, French numerical grades)
Community	Contributor on bioinfo-fr.net, a community French blog for bioinformaticians
Leisure	Read fantasy novels (Markus Heitz, Robin Hobb, Andrzej Sapkowski, …) and watch videos about economics (Heureka)
Geek stuff	Advocate for the open-source and libre cultures, Debian Sid and bépo user, PC builder, server administrator