

Nils Giordano

RESEARCH / DATA SCIENTIST · COMPUTATIONAL SYSTEMS BIOLOGIST

Nantes, France

🏠 www.normalesup.org/~giordano/ | 📧 nigiord | 🌐 [nils-giordano](https://nils-giordano.github.io) | 🎓 Nils Giordano

Research Scientist with 4 year of experience in the analysis and modeling of marine and gut microbiomes

Next-Generation Sequencing – Omics – Data Science – Microbial communities – Metabolic Modeling

Skills

Bioinformatics	Metagenomics (Illumina), Genome binning, Genome annotation (EggNOG/KO), Metabolic reconstruction (CarveMe), Scripting (Python/Bash), Version control (Git), Pipeline design (Snakemake), Cluster/Cloud computing (SGE/Slurm/AWS)
Biomathematics	Network analysis, Optimal control, Optimization, Metabolic modeling (FBA/FVA), Linear/non-linear dynamical systems, Time-series analysis (Kalman filtering/smoothing), Image analysis (segmentation/tracking), Sensitivity analysis
Microbiology	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

Research Scientist / Data Scientist

INTEGRATIVE PHENOMICS, A FRENCH R&D COMPANY ON HUMAN MICROBIOME HEALTH (INDUSTRY)

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 a 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 scientific presentations in front of the press and investors.

Paris, France

Apr. 2020 - Jun. 2022

Postdoctoral Researcher

CNRS – UNIVERSITÉ DE NANTES, LABORATORY OF DIGITAL SCIENCES OF NANTES (ACADEMIA)

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.

Nantes, France

Jan. 2018 - Dec. 2019

Research and Teaching Assistant, PhD Student

INRIA – UNIVERSITÉ GRENOBLE ALPES, PROJECT-TEAM IBIS & LABORATOIRE INTERDISCIPLINAIRE DE PHYSIQUE (ACADEMIA)

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.

Grenoble, France

Sep. 2012 - Mar. 2017

INTERNSHIPS

Research Assistant, Intern

INRIA – SENSITIVITY ANALYSIS FOR A COMPLEX MODEL OF THE GENE EXPRESSION MACHINERY IN *E. coli*

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

Grenoble, France

Feb.-Jun. 2012

Research Assistant, Intern

UNIVERSITY OF CAMBRIDGE – THEORETICAL STUDY OF THE EVOLUTION TOWARDS MULTICELLULARITY IN MICROALGAE

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

Cambridge, United Kingdom

Feb.-Jun. 2011

Research Assistant, Intern

ÉCOLE NORMALE SUPÉRIEURE – DYNAMICAL RESPONSES OF OSCILLATING YEAST CELL SUSPENSIONS TO PERIODIC FORCING

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

Paris, France

Jun.-Jul. 2010

Publications

A genome-resolved co-activity network reveals mechanisms shaping microbial community interactions in the oligotrophic ocean

Giordano, N., Gaudin, M., Trottier, C., Delage, E., Chaffron, S.,
In preparation (Dec. 2022). 2022

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.,
Biomedicine 10.1 (Jan. 2022) p. 16. 2022

Mathematical Modelling of Microbes: Metabolism, Gene Expression and Growth

de Jong, H., Casagrande, 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., Sørensen, 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

French leading research school (*Grande École*), selected via a national competitive exam (*normalien*)

Paris, France

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