

Zafeiropoulos Haris

Bioinformatics, Systems Biology, Microbial Ecology

-  April 24, 1991
-  Lei 11, Leuven, Belgium
-  +32 456 59 4110
-  <https://hariszaf.github.io/>
-  haris.zafeiropoulos@kuleuven.be



About Me

I am developing bioinformatics approaches to enhance the study of microbial communities and their backbone: microbial interactions. As a bioinformatician, I have developed tools covering a range of fields: from metagenomics sequencing analysis to random flux sampling. My main scientific interests focus on microbial interactions and especially metabolic ones. I am keen on the ways microbial communities are instructed from their environment and the effect that this structure has back to the environment. In my endeavors, metabolic modeling has been a rather useful arsenal!

Social Network

-  Github Profile
-  [haris.zaf2](#)
-  [@haris_zaf](#)

Languages

-  English
-  French

Research projects - working Experience

- 2022 - currently **3D'omics** Post-doc
Generate 3D omics landscapes, achieving reconstructions of intestinal host microbiota ecosystems.
- 2022 - 2022 **A workflow for marine Genomic Observatories data analysis** Research associate
Making the large volumes of data produced by genomic observatories more easily interpretable by providing the taxonomic inventories of each sample in a timely manner and in a non-technical format.
- 2018 - 2021 **PREGO: Process, environment, organism (PREGO)** PhD
PREGO is a systems-biology approach to elucidate ecosystem function at the microbial dimension.
- 2019 - present **ELIXIR-GR** technical support
ELIXIR-GR is the Greek National Node of the ESFRI European RI ELIXIR, a distributed e-Infrastructure aiming at the construction of a sustainable European infrastructure for biological information.
- 2018 - 2020 **RECONNECT** PhD
RECONNECT is an Interreg V-B "Balkan-Mediterranean 2014-2020" project. It aims to develop strategies for sustainable management of Marine Protected Areas (MPAs) and Natura 2000 sites.

Education

Graduate studies

- 2018 - 2022 **PhD in Bioinformatics** University of Crete, Biology department
Dissertation IMBBC - HCMR
Microbial communities through the lens of high throughput sequencing, data integration and metabolic networks analysis
- 2016 - 2018 **M.Sc. in Bioinformatics** University of Crete, School of Medicine
grade: 9.1/10.0
Master Thesis IMBBC - HCMR
eDNA metabarcoding for biodiversity assessment: Algorithm design and bioinformatics analysis pipeline implementation

Undergraduate studies

- 2011 - 2016 **B.Sc. in Biology** National & Kapodistrian University of Athens
grade: 6.2 / 10.0
Bachelor Thesis School of Science, department of Biology
Morphology, morphometry and anatomy of species of the genus *Pseudamnicola* in Greece

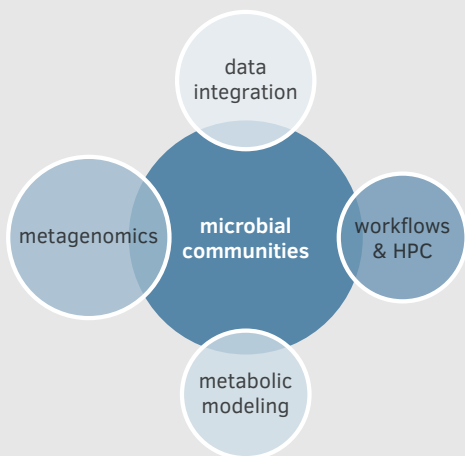
Zafeiropoulos Haris

Bioinformatics, Systems
Biology, Microbial Ecology

Software

pema prego darn dingo
microbetag

Research fields



Memberships



Mikrobiokosmos



International Society of Microbial Ecology



Belgian Society for Microbiology


Publications


- 2024 **dingo: a Python package for metabolic flux sampling**
Chalkis, A., Fisikopoulos, V., Tsigaridas, E. and Zafeiropoulos, H.
Bioinformatics Advances, DOI: 10.1093/bioadv/vbae037
- 2024 **Predicting microbial interactions with approaches based on flux balance analysis: an evaluation.**
Joseph, C., Zafeiropoulos, H., Bernaerts, K. and Faust, K.
BMC Bioinformatics, DOI: 10.1186/s12859-024-05651-7
- 2024 **Establishing the ELIXIR Microbiome Community**
Finn, R.D., Balech, B., Burgin, J., Zafeiropoulos, H., Willassen N.P., Pelletier E., Batut B and 18 more
F1000Research, DOI: 10.12688/f1000research.144515.1
- 2023 **metaGOflow: a workflow for the analysis of marine Genomic Observatories shotgun metagenomics data**
Zafeiropoulos, H., Beracochea, M., Ninidakis, S., Exter, K., Potirakis, A., De Moro, G., Richardson, L., Corre, E., Machado, J., Pafilis, E. and Kotoulas, G.
GigaScience, DOI: 10.1093/gigascience/giad078
- 2023 **A pile of pipelines: An overview of the bioinformatics software for metabarcoding data analyses.**
Hakimzadeh, A., Abdala Asbun, A., Zafeiropoulos, H., Anslan S. and 22 more
Molecular Ecology Resources, DOI: 10.1111/1755-0998.13847
- 2023 **Metabolic models of human gut microbiota: Advances and challenges.**
Garza, D.R., Gonze, D., Zafeiropoulos, H., Liu, B. and Faust, K.
Cell Systems, DOI: 10.1016/j.cels.2022.11.002
- 2022 **Deciphering the community structure and the functional potential of a hypersaline marsh microbial mat community.**
Pavloudi, C. and Zafeiropoulos, H.
FEMS Microbiology Ecology, DOI: 10.1093/femsec/fiac141
- 2022 **Automating the Curation Process of Historical Literature on Marine Biodiversity Using Text Mining: The DECO Workflow.**
Paragkamian, S., Sarafidou, G., Mavraki, D., Pavloudi, C., Beja, J., Eliezer, M., Lipizer, M., Boicenco, L., Vandepitte, L., Perez-Perez, R., Zafeiropoulos, H. and others
Frontiers in Marine Science, DOI: 10.3389/fmars.2022.940844
- 2022 **PREGO: A Literature and Data-Mining Resource to Associate Microorganisms, Biological Processes, and Environment Types**
Zafeiropoulos, H., Paragkamian, S., Ninidakis, S., Pavlopoulos, G., A., Jensen, L., J., Pafilis, E.
Microorganisms DOI: 10.3390/microorganisms10020293
- 2021 **The Dark mAtteR iNvestigator (DARN) tool: getting to know the known unknowns in COI amplicon data.**
Zafeiropoulos, H., Gargan, L., Hintikka, S., Pavloudi, C. & Carlsson, J.
Metabarcoding and Metagenomics, DOI:10.3897/mbmg.5.69657
- 2021 **0s & 1s in marine molecular research: a regional HPC perspective**
Zafeiropoulos, H., Gioti A., Ninidakis S., Potirakis A., ..., & Pafilis E.
GigaScience, DOI: 10.1093/gigascience/giab053


Zafeiropoulos Haris


Bioinformatics, Systems
Biology, Microbial Ecology


Coding Skills


 Unix / Linux / AWK


 Python 3.0


 Matlab

 R


 C++


 HTML / CSS / JS

 Docker & Singularity


 REST API


Math and Stats


 Linear Algebra


 Constraint-based modelling

Barskills

 Microbial ecology

 Metabolic modeling

 Coding/programming

 Scientific writing

2021	Geometric Algorithms for Sampling the Flux Space of Metabolic Networks <i>Chalkis, A., Fisikopoulos, V., Tsigaridas, E. & Zafeiropoulos, H.</i> <i>37th International Symposium on Computational Geometry (SoCG 2021)</i> , DOI: 10.4230/LIPIcs.SocG.2021.21
2021	The Santorini Volcanic Complex as a Valuable Source of Enzymes for Bioenergy <i>Polymenakou, P.N., Nomikou, P., Zafeiropoulos, H., Mandalakis, M., Anastasiou, T.I., Kiliass, S., Kyrpides, N.C., Kotoulas, G. & Magoulas, A.</i> <i>Energies</i> , DOI: 10.3390/en14051414
2020	PEMA: a flexible Pipeline for Environmental DNA Metabarcoding Analysis of the 16S/18S ribosomal RNA, ITS & COI marker genes <i>Zafeiropoulos, H., Viet, H.Q., Vasileiadou, K., Potirakis, A., Arvanitidis, C., Topalis, P., Pavloudi, C. & Pafilis, E</i> <i>GigaScience</i> , DOI:10.1093/gigascience/giaa022
2024	Improving genome-scale metabolic models of incomplete genomes with deep learning <i>Boer, M.D., Melkonian, C., Zafeiropoulos, H., Haas, A.F., Garza, D. and Dutilh, B.E.</i> under revision in <i>iScience, bioRxiv</i>
2024	microbetag: simplifying microbial network interpretation through annotation, enrichment tests & metabolic complementarity analysis <i>Zafeiropoulos, H., Delopoulos, E.I.M., Erega, A., Geirnaert, A., Morris, J. and Faust, K.</i> under review in <i>Microbiome</i>
2024	A long-term ecological research data set from the marine genetic monitoring programme ARMS-MBON 2018-2020 <i>Daraghme, N., .. Zafeiropoulos, H... Pavloudi, C., and Matthias O.</i> under review in <i>Molecular Ecology Resources</i>

Zafeiropoulos Haris

Bioinformatics, Systems
Biology, Microbial Ecology

Conferences

2024	Belgian Society for Microbiology: Annual Symposium @ Brussels, Belgium <i>Poster presentation:</i> microbetag: simplifying microbial network interpretation through annotation, enrichment and metabolic complementarity analysis	BSM2024
2022	1st Applied HoloGenomics conference @ Bilbao, Spain <i>Poster presentation:</i> microbetag: a microbial co-occurrence network annotator	AHC2022
2022	18th International Symposium on Microbial Ecology @ Laussane, Switzerland <i>Poster presentation:</i> Reverse ecology and systems biology approaches to identify key processes ensuring life in extreme environments	ISME18
2021	Bioinformatics Open Source Conference (BOSC) - online <i>Flash talk:</i> dingo: A python library for metabolic networks sampling & analysis.)	BOSC2021
2021	1st DNAQUA International Conference - online <i>Flash talk:</i> PEMA v2: addressing metabarcoding bioinformatics analysis challenges	DNAQUA
2020	Federation of European Microbiological Societies (FEMS) - online <i>Flash talk:</i> Mining literature and -omics (meta)data to associate microorganisms, biological processes and environment types	FEMS2020
2020	PyData Global - online <i>Oral presentation:</i> Geometric and statistical methods in systems biology: the case of metabolic networks	PyData2020
2019	network2019: 4th Symposium on Ecological Networks @ Paris, France Participation.	network2019
2019	8th International Barcode of Life Conference @ Trondheim, Norway <i>ePoster presentation:</i> P.E.M.A.: a Pipeline for Environmental DNA Metabarcoding Analysis	iBOL
2018	European Conference on Computational Biology (ECCB) 2018 @ Athens, Greece <i>Poster presentation:</i> P.E.M.A.: a Pipeline for Environmental DNA Metabarcoding Analysis	ECCB18

Workshops & Summer schools

2023	Economic Principles in Cell Physiology @ Paris, France Mathematical modeling of cellular systems and “resource allocation thinking”. <i>Poster presentation:</i> “sampl’em all”: exploring potential flux sampling applications	EPCP2023
2022	Microbial communities: current approaches and open challenges Interdisciplinary exchanges in microbial communities’ research and the emerging challenge areas.	UMCW06
2022	ELIXIR Fluxomics Training School 2021 An introduction to the field of fluxomics and the experimental and computational methods used to estimate and predict metabolic fluxes	ELIXFLUX
2020	Metagenomics, Metatranscript- omics and multi 'omics for microbial community studies A Physalia Course from Prof. Dr. Curtis Huttenhower	material

Zafeiropoulos Haris

Bioinformatics, Systems
Biology, Microbial Ecology

Supervision

ongoing	Andrey Radev, MSc student @ Bioinformatics KU Leuven post Visualisation and analysis of microbial growth data to facilitate interactions investigation and interactions' strength assessment
ongoing	Anna Voukouna, MSc student @ Bioinformatics DUTH, Greece post Investigation of microbial metabolic interactions potential across the Genome Taxonomy Database representative genomes
ongoing	Sotiris Touliopoulos, Google Summer of Code 2024 with GeomScale org. post Pre- and post-sampling features to leverage flux sampling at both the strain and the community level
2023-2024	Sofia Monsalve Duarte, MSc student @ Bioinformatics KU Leuven thesis "Creation and implementation of a database interface for the collection and analysis of microbial growth data"
2023	Ermis Ioannis Michail Delopoulos, Google Summer of Code 2023 with NRRB org. post Development of a Cytoscape App for microbe-microbe association networks
2022-2024	Ermis Ioannis Michail Delopoulos, MSc student @ Bioinformatics KU Leuven thesis "Development of a graphical user interface for microbetag"
2022-2023	Julia Casado Gómez-Pallete, MSc student @ Bioinformatics KU Leuven thesis "Development of a database for human gut bacterial growth curves"

Teaching

2024	Exploring the microbiome with high-throughput sequencing technologies: a bioinformatics perspective (part II) slides Lecture on MSc "Applied Bioinformatics & Data Analysis" in Democritus University of Thrace, Greece
2024	Exploring the microbiome with high-throughput sequencing technologies: a bioinformatics perspective slides Lecture on MSc "Applied Bioinformatics & Data Analysis" in Democritus University of Thrace, Greece
2023	eDNA metabarcoding, pipeline development & high performance computing slides Lecture on MSc "Applied Bioinformatics & Data Analysis" in Democritus University of Thrace, Greece
2023	eDNA metabarcoding, pipeline development & high performance computing slides Lecture on MSc "Applied Bioinformatics & Data Analysis" in Democritus University of Thrace, Greece
2022	Genome-scale model reconstruction GColab notebook Lectures on "Master en bioinformatique et modélisation" of the Université Libre de Bruxelles.
2021	Microbiome Data Analyses Workshop Online MDAWO Tutorial: PEMA: a flexible Pipeline for Environmental DNA Metabarcoding Analysis of the 16S/18S rRNA, ITS and COI marker genes.
2020	Environmental DNA & DNA metabarcoding slides Lecture on MSc "Environmenta Biology" in University of Crete.

Zafeiropoulos Haris

Bioinformatics, Systems
Biology, Microbial Ecology

Awards

2021	Google Summer of Code Project title: <i>From DNA sequences to metabolic interactions: building a pipeline to extract key metabolic processes</i>	GSoC
2021	European Molecular Biology Organization Short-Term Fellowship Project title: <i>"Exploiting data integration, text-mining and computational geometry to enhance microbial interactions inference from co-occurrence networks"</i>	EMBO
2020	Federation of European Microbiological Societies Meeting Attendance Grant for joining the <i>"Metagenomics, Metatranscript- omics and multi 'omics for microbial community studies"</i> Physalia course	FEMS
2019	Short Term Scientific Mission (STSM) @ DNAqua-net COST action Project title <i>A comparison of bioinformatic pipelines and sampling techniques to enable benchmarking of DNA metabarcoding</i> . Report.	DNAqua-net
2018	Best Poster Award @ Hellenic Bioinformatics conference for <i>PEMA: a Pipeline for Environmental DNA Metabarcoding Analysis</i>	HBIO

References

Karoline Faust	Department of Microbiology, Immunology and Transplantation, Rega Institute for Medical Research, Laboratory of Molecular Bacteriology, KU Leuven Leuven, 3000, Leuven, Belgium ☎: +3216322698 ✉: karoline.faust@kuleuven.be
Pafilis Evangelos	Institute of Marine Biology, Biotechnology & Aquaculture, Hellenic Centre for Marine Research, (IMBBC - HCMR), Gournes, Pediados, P.O. Box 2214, Heraklion Crete 71003, Greece ☎: +30 2810 337740 ✉: pafilis@hcmr.gr
Elias Tsigaridas	Institut de Mathématiques de Jussieu - Paris Rive Gauche, Sorbonne Université - Campus Pierre et Marie Curie, Case courrier 247, 4, place Jussieu, 75252, Paris Cedex 05, France ☎: +33 014427 8539 ✉: elias.tsigaridas@inria.fr
Georgios Kotoulas	Institute of Marine Biology, Biotechnology & Aquaculture, Hellenic Centre for Marine Research, (IMBBC - HCMR) Gournes, Pediados, P.O. Box 2214, Heraklion Crete 71003, Greece ☎: +30 2810 337740 ✉: kotoulas@hcmr.gr