



UNIVERSITÀ
POLITECNICA
DELLE MARCHE



Title: Understanding evolutionary dynamics using temporal genomics data

Supervisor: Emiliano Trucchi
Department of Life and Environmental Sciences,
DiSVA



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The Supervisor

Associate Professor in Genetics at the Department of Life and Environmental Sciences (DiSVA), UNIVPM; Head of the Genomics Lab and coordinator of the DiSVA High-Performance Computing cluster; Delegate for the International affairs and the Erasmus program at DiSVA. Expert in the field of population genetics, evolutionary and conservation genomics, and bioinformatics with a focus on understanding the evolutionary dynamics of neutral and adaptive processes with cutting-edge genomics data.

Author of 64 peer-reviewed publications. ORCID: 0000-0002-1270-5273
Citations, H-index: 2750, 27 (scholar); 1850, 23 (Scopus).

Past relevant roles:

2016-2019 Researcher at the University of Ferrara, Italy

2014-2016 Researcher at the University of Vienna, Austria

2011-2014 Researcher at the University of Oslo, Norway

2022,2023,2024. Coordinator or member of the LOC for the organization of SMBE and SIBE international conferences

Supervision and mentoring

5 Postdocs (2 ongoing), 12 PhD students (3 ongoing), 17 Master students (4 ongoing)

International teaching

Co-director of the Workshop on Population and Speciation Genomics. Cesky Krumlov Czech Rep in 2016, 2018, 2020, 2022, and 2025.

Most recent Research Projects:

NATIONAL AND INTERNATIONAL GRANTS

- 2022 PNRR – NBFC (Spoke2). 54k€
- 2022 PRIN (2022BXRY95). Local unit PI. 51k€
- *2022 HORIZON-MSCA-2021-PF-01 (EC). Host-PI. 184k€
- 2017 PNRA (National Antarctic Program - CNR), Project number: 00164. PI. 118k€
- *2011 FP7-PEOPLE-2009-IEF, ID: 252252 (EU). PI. 204k€
- *MSCA fundings as PI and HOST-PI

Fundings by host institution as PI:

- 2019-2024 Basic research funds at UNIVPM (RSA): 3.6k€/year
- 2017-2019 Basic research funds at Ferrara Univ (FAR): 3.2k€/year
- 2019-2024 6 PhD fellowships granted at UNIVPM, University of Pavia and University of Palermo. Ca. 400K€



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HR EXCELLENCE IN RESEARCH

The Department of Life and Environmental Sciences

Director: Prof. Francesco Regoli

Awarded Department of Excellence
(2018-2022) with 7.3 million EUR grant,
Confirmed in the list of the 350
Departments of Excellence 2023–2027

11 funded European projects (2021-
2024) >4,5 M €

9 Research Infrastructures & Excellence Laboratories:

- Marche Structural Biology Center (Ma.S.Bi.C.);
- The Aquarium-Joint Research Unit (JRU) of EMBRC ITALY (EMBRC-IT);
- Laboratory of Advanced Microscopy Research Instrumentation;
- Advanced Laboratory of Mass Spectrometry;
- Computing Data Center-DiSVA-HPC;
- Radioisotope Laboratory;
- Research vessel ACTEA;
- Fano Marine Center (FMC);
- Oceanographic buoy Fortunae.

> 1.800 students

109 PhD candidates (2021-2024)

25 Professors have *h* index between 30 and
>89, 15 have between 100 and 400
publications, 1 in Highly Cited Researchers
(Clarivate)

89 units of permanent staff (Professors,
technicians and administrative personnel)



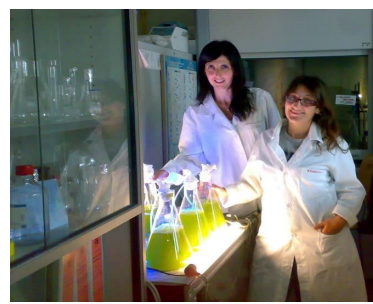
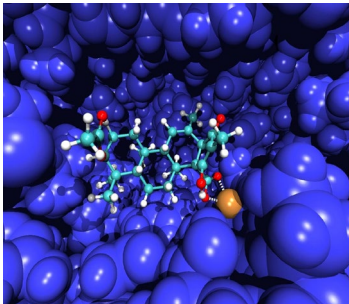
**Dipartimento
di Scienze
della Vita
e dell'Ambiente**

DiSVA

OUR KEYWORDS

FIELD ACTIVITIES
ADVANCED LABORATORIES
INTERNATIONALIZATION
CONSERVATION
EXTREME ENVIRONMENTS
HEALTHY OCEANS
STRUCTURAL BIOLOGY
MONITORING AND EMERGING RISKS
CELLULAR BIOTECHNOLOGIES
ENVIRONMENTAL AND HUMAN EMERGENCIES

in 2021-24 > 170 national projects for > 12,5 Mil €



Teaching programmes:
2 First cycle degrees, 4 Master degrees, 5 PhD Courses (3
are National), 1 International master

First cycle degrees

Environmental
Sciences and
Civil Protection

Biological
Sciences

Master degrees

Marine Biology

Molecular and
Applied
Biology

Environmental
risk & Civil
Protection

Nutrition &
Food Sciences

International
Master of
Science in
Marine
Biological
Resources
(IMBRSea)

PhD Courses

Earth
Observation

Sustainable
development &
Climate change

Life and
Environmental
Sciences

Biodiversity

Polar Sciences

Heritage
Sciences



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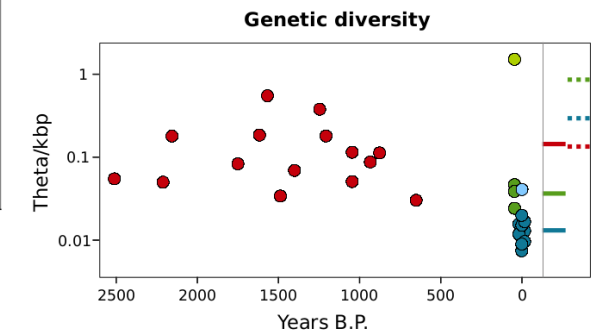
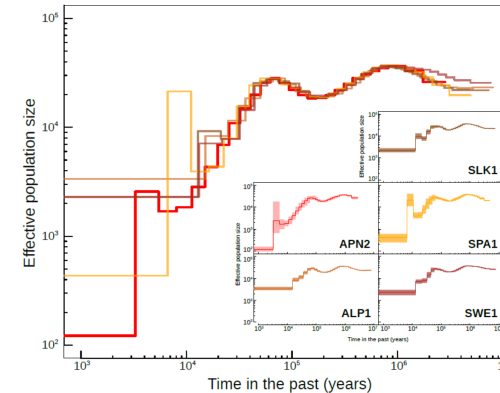
THE RESEARCH GROUP: Genomics Lab

My research group currently includes two postdocs (Josephine Paris, with a MSCA fellowship, and Marco Gargano), three PhD students (Francesco Giannelli, preparing his thesis defense, Sebastiano Fava, starting his second year, and Matteo Marchetti, who just started his first year), four Master students, and one guest researcher (Joan Ferrer Obiol).

My main collaborators are Prof Giorgio Bertorelle, (University of Ferrara, Italy) with projects in Conservation Genomics of Italian endemic species and Dr. Celine Le Bohec (CNRS, France), with projects in evolutionary genomics of king and emperor penguins.

Our expertise in non-model species genomics allowed us to design novel approaches and methodologies to estimate demographic histories (Trucchi et al 2014), to identify genome-wide methylation patterns (Trucchi et al 2016a), to test models of genetic diversity decay during a biological invasion (Trucchi et al 2016b), and to infer population structure (Malinsky et al 2018).

Fully embracing the opportunities opened up by the availability of genomics data, our research focuses on investigating neutral and adaptive evolutionary processes in natural populations of animals (e.g., Fava et al 2024) and plants (e.g., Trucchi et al 2017), testing novel hypotheses in the study of eco-evolutionary dynamics as in the case of large penguins (Cristofari et al 2018, Pirri et al 2022, Paris et al 2024, Trucchi et al 2025), and exploring innovative analytical frameworks to detect selective processes in endangered (Benazzo et al 2017, Bertorelle et al 2022) or domesticated species (Trucchi et al 2021), using modern and ancient whole-genome data. Some of my work raised a broad interest in the public as well as in rather distant research fields like physical oceanography (Trucchi et al 2019).





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Project Idea

Title: Understanding evolutionary dynamics using temporal genomics samples

Background: Genomics of modern and ancient samples can be leveraged to gain insights into long and short term evolutionary dynamics with applications in conservation biology, climate change biology and recent evolution including artificial selection (a.k.a. domestication) of animal and plant species. Fast-improving and cost-effective sequencing technologies allowed the production of vast genomics dataset from non-model species that can be used to investigate neutral and adaptive evolutionary processes.

In this respect, ACTIONS will develop the following research objectives aimed to:

- 1. Test evolutionary hypotheses on species diversification, neutral and non-neutral diversity dynamics in populations or species, adaptation, and natural or human-mediated selection while relying on already existing genomic resources of plant or animal species;**
- 1. Ask questions about hybridization and adaptive introgression among closely related species (species complexes) and populations;**
- 1. Focus on recent evolutionary dynamics using extant and old samples (temporal genomics);**
- 1. Emphasize the societal impact of genomics studies.**