UNIVERSITÀ POLITECNICA DELLE MARCHE

Supervisor: Giorgia Gioacchini

Activities

POSITION: Associate Professor in Cell Biology and Reproductive Biology of marine animals.
Department of Life and Environmental Sciences (DiSVA)
Università Politecnica delle Marche (UNIVPM)
Ancona, Italy

RESEARCH INTERESTS: My research focuses on the **reproductive biology, embryo development and health status of marine organisms**, with particular attention to the impact of environmental change and anthropogenic stressors.
Main research topics include:
- reproductive biology and physiology of marine species
- embryo development and early life stages
- effects of pollutants and environmental stressors (mostly microplastics)
- biomarkers of health and reproductive capacity
- conservation biology of marine species

Research integrates **cell biology, molecular biology and physiology approaches**.

MODEL SPECIES: My research focuses on several key Mediterranean marine species used as models to study reproduction, development and environmental stress:• swordfish (Xiphias gladius)• bluefin tuna• sardine (Sardina pilchardus)• cephalopods such as Sepia officinalis• marine reptiles such as Caretta caretta. These species provide valuable models for studying reproductive strategies, early development and environmental impacts on marine biodiversity.

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RESEARCH PROJECTS: I am currently involved in several national and international research projects focused on the application of **omics approaches to reproductive biology, fisheries science and biodiversity assessment**.

Key activities include:

- **ICCAT international programme on swordfish biology (2019–2026)**

Application of genomic and epigenetic approaches (ddRAD, WGS, RRBS) to investigate **population structure, age estimation and reproductive traits** in *Xiphias gladius*.

- **CARDIMED – Horizon Europe MISS-2022-CLIMA-01-06**

Application of **environmental DNA (eDNA)** for biodiversity monitoring in marine ecosystems.

- **FOLOU – Horizon Europe CL6-2022-FARM2FORK-01**

Molecular tools for seafood traceability and quality assessment.

- **BioPlast4SAFE and related projects**

Application of molecular biomarkers and omics approaches to assess the effects of **microplastics and environmental contaminants** on marine organisms.

HR EXCELLENCE IN RESEARCH

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Description

SCIENTIFIC PROFILE: More than 110 papers in international peer-view journal, 3 book chapters. H-index:42 (Scopus). Author id:23004112500 (scopus) web of science researcher id: aau-3581-2021 orcid code: orcid.Org/0000-0003-1187-7302.
part of the stanford/elsevier top 2% scientists list 2023 and 2024.

ROLES IN SCIENTIFIC COMMUNITY

Active member of several international scientific networks and expert groups including:

- **ICCAT Swordfish Species Group**
- **International Society for Fish Endocrinology (ISFE)**
- **European Society for Comparative Endocrinology (ESCE)**
- **Adriatic Advisory Council (AAC)**
- **Gruppo Embriologico Italiano (GEI)** – Secretary of the Board
- **Member of the Animal Welfare Body (AWB)** at UNIVPM

MENTORSHIP EXPERIENCE

Extensive experience in supervising students and early-career researchers:

- **3 PhD theses supervised**
- **>25 MSc theses supervised**
- **>40 Bachelor theses supervised**

Mentoring activities focus on **experimental design, data analysis and scientific writing**, supporting the development of independent research skills.

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Staff, equipment and laboratories

DEVELOPMENTAL AND REPRODUCTIVE BIOLOGY LAB STAFF

- **2 full Professor, 2 associate professors, 4 post-doc researcher**
- **4 PhD students and several master students.**

LAB & EQUIPMENT

The research environment provides access to well-equipped laboratories supporting molecular biology and environmental sciences.

Available facilities and platforms include:

• molecular biology laboratories for DNA and RNA extraction and preparation of samples for sequencing analyses

• bioinformatic infrastructure for the analysis of genomic and transcriptomic datasets (ddRAD, WGS, RNA-seq), with sequencing performed through external specialized facilities

• laboratories supporting epigenetic analyses and DNA methylation studies, combined with bioinformatic data analysis

• microscopy and histology facilities for the study of reproductive tissues and developmental stages

• advanced spectroscopic platforms (FTIR and Raman spectroscopy) available through the ARI laboratory

• experimental facilities at the UNIVPM Aquarium infrastructure for studies on aquatic organisms and early life stages.

These infrastructures enable the integration of omics data analysis, physiological approaches and experimental studies to investigate age determination, sex identification and reproductive status in aquatic organisms.

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Project idea **Omics Tools for Age, Sex and Reproductive Status Determination in Marine Fish**

SCIENTIFIC BACKGROUND

Accurate information on age, sex and reproductive status is fundamental for understanding the life history and population dynamics of marine fish species.
Traditional approaches for determining these parameters are often limited in accuracy, invasive, or difficult to apply in large or poorly studied species.
Recent advances in omics technologies provide new opportunities to develop innovative molecular tools for biological and ecological investigations.

RESEARCH OBJECTIVE

Develop and validate omics-based tools to improve the determination of:

- biological age
- sex identification
- reproductive maturity

in marine fish species of ecological and fisheries relevance.

EXPECTED IMPACT

The project will contribute to:

- improving biological knowledge of marine fish reproduction
- developing innovative molecular tools for age, sex and maturity determination
- advancing the application of omics approaches in marine organism biology and fisheries science

, data analysis and scientific writing, supporting the development of independent research skills.