

**Umberto Valdrè**

Date of birth: Nationality: Gender: Male

About me:

I am an Italian student interested in studying the evolutionary mechanisms and trajectories that led to the diversity of Life. Particularly, I would like to understand how different molecular pathways act and interact to "build" an organism, and how these pathways emerged and diversified during the divergence of different evolutionary lineages. Moreover, I am interested in understanding how the different mechanisms of germline specification evolved, how the molecular pathway involved in the specification and differentiation of this cellular line emerged, and which selective pressures drove the emergence of germ cells in multicellular organisms. For these reasons, my professional goal is to obtain the possibility to study these topics in a stimulating environment.

● EDUCATION AND TRAINING

16/12/2021 – Bologna, Italy

MASTER'S DEGREE IN BIODIVERSITY AND EVOLUTION – ALMA MATER STUDIORUM – UNIVERSITÀ DI BOLOGNA

Thesis abstract: "Tudor domain-containing proteins, or Tudor proteins, are a diverse set of proteins that mediate protein-protein interactions and are involved in different epigenetic pathways, such as histone binding, pre-RNA splicing and RNA interference. A previously proposed functional classification divided Tudor proteins in four Groups, that are characterized by the evolutionary stepwise accumulation of specific N-terminal structures associated to different functions.

This thesis aims to clarify the evolution of Tudor domains and proteins in metazoans through bioinformatic analyses. I used bioinformatic tools to produce a maximum-likelihood tree of 5145 Tudor domains collected from 93 species belonging to 17 different phyla. I found that Tudor protein family had already diversified to current levels in the common ancestor of Metazoans, but I could not confidently reconstruct the ancestral state of the common ancestor of the Tudor domain.

I also investigated the variability in the number of Tudor proteins in my dataset, correlating this variable with genome size and number of Piwi-like proteins (involved in the piRNA pathway against retrotransposon activity). I found that the loss of Tudor proteins was shared by almost all endoparasites of the dataset, probably due both to the genome reduction that accompanied the structural simplification of the parasitic habit, and to variability in TE activity. The same reasons probably guided the expansion of Tudor proteins that I could observe for some free-living species. Further analyses should be performed to investigate more in detail the causal reasons behind these patterns."

Address Bologna, Italy | **Field of study** Biology | **Final grade** 110/110 cum laude |

Thesis Tudor protein family evolution: a metazoan-wide analysis

15/10/2019 – Bologna, Italy

BACHELOR'S DEGREE IN BIOLOGICAL SCIENCES – ALMA MATER STUDIORUM – UNIVERSITÀ DI BOLOGNA

Thesis abstract: "The increase of CO₂ anthropic emissions is causing numerous changes in seawater chemistry, including ocean acidification, which has consequences on several biological processes in marine organisms, such as corals. This thesis describes the short-term effects of the ocean acidification on the reproductive biology of the solitary madrepor and zooxanthellate *Balanophyllia europaea*, transplanted along a natural gradient of pCO₂ generated from a submarine volcanic crater near Panarea island (Sicily, Italy). Through cytohistometric analyses we observed that the reproductive biology of *B. europaea* was unaltered with the increase of acidification, even at extremely acid pH. This high resistance may be due to the symbiosis of *B. europaea* with zooxanthellae. Indeed, with the rising of pCO₂, zooxanthellae could increase their photosynthetic efficiency and thus, provide additional energy to the coral. Moreover, the slow-

growing model of *B. europaea* allows to spend more energy in reproduction. Thus, both the trophic strategy and the growing model of this species seems to give a good resistance to the gametogenesis of the coral if exposed to more acid pH for short periods."

Address Bologna, Italy | **Field of study** Biology | **Final grade** 106/110 |

Thesis Quantify the reproductive capacity of the solitary coral *Balanophyllia europaea* (Scleractinia, Dendrophylliidae) sampled in 4 sites along a natural pH gradient at Panarea

● WORK EXPERIENCE

01/2022 – CURRENT – Bologna, Italy

RESEARCH COLLABORATOR – ALMA MATER STUDIORUM - UNIVERSITÀ DI BOLOGNA

Research collaborator at the Biological, Geological and Environmental Sciences Department – University of Bologna.

My activities include both bioinformatic analyses with genomic, transcriptomic and proteomic sequences, and immunohistochemistry protocol to detect in tissue and cell the localization pattern of the targets identified with the bioinformatic approach (e.g., the Tudor protein TDRD7).

Currently, I'm writing a paper about Tudor proteins to be submitted soon at a peer reviewed international scientific journal.

Department Department of Biological, Geological and Environmental Sciences |

Address 40126, Bologna, Italy | **Email**

09/2022 – CURRENT – Bologna, Italy

TUTOR – ALMA MATER STUDIORUM - UNIVERSITÀ DI BOLOGNA

Support and assistance to teaching for the course "Comparative Anatomy" at the bachelor degree Biological Sciences – Alma Mater Studiorum Università di Bologna.

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09/2022 – CURRENT – Bologna, Italy

TUTOR – ALMA MATER STUDIORUM - UNIVERSITÀ DI BOLOGNA

Support and assistance to teaching for the course "Citology and Histology" at the bachelor degree Biological Sciences – Alma Mater Studiorum Università di Bologna.

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10/2020 – 12/2021 – Bologna, Italy

INTERNSHIP FOR MASTER THESIS – ALMA MATER STUDIORUM - UNIVERSITÀ DI BOLOGNA

Activities included bioinformatic analyses with genomic, transcriptomic and proteomic metazoan sequences. During this internship I learned the *GNU bash* and *R* languages and how to use some of the most used software (OrthoFinder, InterProScan, HMMER, MAFFT, TCOFFEE, IQTREE) in order to analyze in an evolutionary framework a great amount of data.

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02/2019 – 09/2019 – Bologna, Italy

INTERNSHIP FOR BACHELOR THESIS – ALMA MATER STUDIORUM - UNIVERSITÀ DI BOLOGNA

Activities included histochemistry and cytohistometric protocols performed on *B. europeae* specimen and their visualization at the optical microscope. The individuals, collected along a natural pCO_2 gradient at Panarea Island (Italy), were post-fixed in Bouin solution, decalcified with EDTA, dehydrated with alcohol series (from 80% to 100%), included in paraffin and then cut into 7 μm cross-section. The sections so obtained were colored with hematoxylin and eosin in order to measure the number and the size of oocytes, spermaries and embryos at the optical microscope and through the usage of the NIKON NIS-Element D 3.2 software. The data collected were used to determine some reproductive parameters, such as size at sexual maturity, fecundity, fertility and gonadal index for each specimen.

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● CONFERENCES AND SEMINARS

04/09/2022 – 07/09/2022 – Ancona, Italy

9TH SIBE CONGRESS - EVOLUZIONE 2022

I presented my Masters' degree thesis work at the international scientific meeting "9th SIBE congress – Evoluzione 2022" (Ancona, Italy), with a poster titled "Tudor protein family evolution: a metazoan-wide analysis".

31/05/2022 – 04/06/2022 – Naples, Italy

EURO EVO DEVO 2022

I presented my Masters' degree thesis work at the international scientific meeting "Euro Evo Devo 2022" (Naples, Italy) with a poster titled "Tudor protein family evolution: a metazoan-wide analysis".

● HONOURS AND AWARDS

07/2022

Best master degree thesis about "Evolution of the Tudor genic family" – ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

Winner of the award for the best master degree thesis about "Evolution of the Tudor genic family". The award was financed by the Department of Biological, Geological and Environmental Sciences of the Alma Mater Studiorum - University of Bologna (Italy), and consisted of a sum equal to 700,00 € (gross of legal deductions and inclusive of the costs borne by the institution).

● LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	B2	B2	B2	B2	B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● **DIGITAL SKILLS**

My Digital Skills

Document editing and management

Google Tools (Google Docs, Google Drive, Google Scholar, etc.) | Good knowledge of Microsoft Office (Word, Excel, Powerpoint, Access, Outlook)

Bibliographic research

Good knowledge in the use of scientific databases (Scopus, Web Of Science, Google Scholar, PubMed)

Operative Systems

Good knowledge of Windows 10 and 11 | Basic knowledge of Linux

Programming languages

R | GNU Bash

● **DRIVING LICENCE**

Driving Licence: B | 25/05/2016 – 12/12/2026