Mirko Martini

Ambitious and resilient graduated student in Biodiversity and Evolution with a solid background in molecular biology, wet lab, and dry lab. Interested in an academic career focused on evolutionary developmental biology. Fascinated the most by longevity and the genotype-phenotype relationship.

Research experience

November 2024- expected March 2028

PhD student in Evolutionary Biology, *Evo-Com Lab*, Alma Mater Studiorum, Bologna

The title of my PhD project is "Mitonuclear coevolution and life traits evolution: a comparative genomic approach". Throughout this project, I will study mitonuclear interactions, primarily using birds and insects as model organisms. My focus will include the role of mitochondria in ageing, mate choice and fitness establishment, and a deeper exploration of mitonuclear interactions. I aim to address underexplored areas, such as interaction during mitochondrial translation and the role of nuclear protein in the assembly of electron transport system complexes.

April 2024- October 2024

Attending graduated student, *Evo-Com Lab*, Alma Mater Studiorum, Bologna

I continued the research started during my master's degree internship refining some analyses. I enhanced my skills and knowledge using new programs, programming languages, and bioinformatic tools (like NextFlow as a workflow management system) while increasing my proficiency in those that I already knew.

October 2022- March 2024

MSc Internship, *Evo-Com Lab*, Alma Mater Studiorum, Bologna

I worked on my MSc final-year project that I mostly independently curated, from the dataset collection to analysis development and execution. Aves are a new and interesting model species to study longevity and ageing since their great lifespans and low rate ageing process. I collected a dataset of 141 species, either long-lived and short- or normal-lived, and performed convergent analyses based on relative evolutionary rates of more than 10k amino acid sequences using the program TRACCER. The resulting genes were investigated for functional enrichments and interesting pathways using GO terms and KO orthologues. The results could highlight new functions and genes protagonists in the ageing process whose manipulation may change a species-specific maximum lifespan.

February 2021- July 2021

BSc Internship, *BMS Lab — Bioinformatic, Mathematical modeling, and Synthetic biology*, University of Pavia, Pavia

I worked on my BSc final-year project independently carrying out my experiments using modern genetic manipulation techniques like CRISPR/Cas9. In particular, the aim of the work was to investigate the construction of a new probiotic microorganism able to revert antibiotic resistance in pathogenic gut microbial infections. Antibiotic resistance is a modern world crisis, in particular in hospitals. I personally assessed the efficiency of transmission of a CRISPR/dCas9 plasmid between two microorganisms using conjugation and its ability to revert the antibiotic-resistant phenotype in the pathogenic one.

Via Gastone Rossi, 12, Apartment 4 – 40138 – BO
+39 3349742698 • *mirko.martini3@unibo.it*

Teaching experience

2024-2025 **Teaching assistant - Laboratory of comparative genomics**, *Alma Mater Studiorum*, Bologna

I am currently working as a teaching assistant for the course "Laboratory of comparative genomics" in the second year of the Master's program in Biodiversity and Evolution. My role involes teaching fundamental bioinformatic concepts and guiding students in a project that includes genome assembly and comparative genomics.

Education

2021–2024 **MSc — Biodiversity and Evolution**, *Alma Mater Studiorum*, Bologna

- This master's degree course is developed to give students the ability to apply an evolutionary perspective to understand and explain biological phenomena. After a first year of more general courses, during which phylogenesis and evolution theory are taught, the second is split into three curricula. I chose the genetic and genomic one, gaining strong knowledge on the use of genetic and bioinformatic resources to address biological questions and attending one of the few courses on Evo-Devo in Italy.
- Final-year project title: "Long-liveness in Aves: convergent evolution supports a more conserved cell cycle and division compared to short-lived birds" with Dr. Mariangela Iannello as my co-supervisor and Professor Liliana Milani as my supervisor.

2018–2021 **BSc — Biotechnology**, *University of Pavia*, Pavia

- I developed a strong molecular biology, microbiology, genetic engineering, and wet lab background and interest.
- Final-year project title: "Experimental evaluation of bacterial conjugation as a tool for the delivery of CRISPRi systems useful for antibiotic resistance inhibition" with Dr. Angelica Frusteri Chiacchiera as my co-supervisor and Professor Lorenzo Pasotti as my supervisor.

2017–2022 **Three-year Diploma in the Disciplinary Area of Biomedical Sciences**, *University School for Advanced Studies IUSS*, Pavia

- IUSS is a university school that collects the best students in Pavia and offers them additional courses to enhance and refine their knowledge and expertise. The main focus of the school is interdisciplinarity, and students are encouraged to study subjects outside their primary disciplinary area. For this reason, aside from courses pertaining to the biomedical area and neurosciences, I attended some related to linguistics, neurolinguistics, and philosophy.
- Final-year project title: "An overview of Primary Progressive Aphasia and its logopenic variant" under the supervision of Professor Cristiano Chesi.

Extracurricular activities

2022–2024 **Biodiversity and Evolution course representative and member of the joint committee**, *Alma Mater Studiorum*, Bologna

- I acted as the official representative for the Biodiversity and Evolution course, helping and favouring the interaction between students and faculty members.
- I contributed to discussions and initiatives aimed at enhancing academic programs and student welfare, such as the joint commission where the quality of courses is discussed by a select group of students and professors, with considerations based on student feedback.

Via Gastone Rossi, 12, Apartment 4 – 40138 – BO
+39 3349742698 • *mirko.martini3@unibo.it*

Technical and personal knowledge

- **Programming languages:** Proficient in Bash, Python3, R, and TeX. Advanced in Snakemake workflows and Git.
- **Software knowledge:** MS Office suite (proficient), common programs from phylogenetic inference (IQtree, RaxML), convergent evolution analyses (TRACCER), selective pressure analyses (codeml), general data and big data elaboration (Orthofinder, DISCO, MAFFT, BMGE).
- **IT Certifications:** Bash, R, Python 3, and Git & GitHub Codecademy certificates.
- **Wet Lab Skills:** Cell culture, Conjugation, DNA/RNA purification, DNA manipulation, plate reader.

- **Language knowledge:** Italian (native speaker); Fluent in English and Spanish.
- **Skills:** Attention to detail, Problem-solving, Teamwork.

Passion

- **Continued learning:** Attending online and in-presence courses to enhance interdisciplinarity and increase my knowledge.

References

- **Professor Liliana Milani** - University of Bologna, +39 0512094220, liliana.milani@unibo.it
- **Mariangela Iannello, PhD** - University of Bologna, mariangela.iannello2@unibo.it
- **Angelica Frusteri Chiacchiera, PhD** - Institut Pasteur, angelicafrusterichiacc@gmail.com

Oral Presentation

- Iannello M., **Martini M.**, Piccinini G., Milani L. New animal model systems in the study of ageing and longevity. GEI-SIBSC 2024, Napoli, Italy, 11-14 June 2024. Presented by Milani L.

Publications

- **Manuscript preparation**. **Martini M.**, Iannello M., Piccinini G., Milani L.. *Cell cycle control and metabolism enhancement at the base of opposite longevity phenotypes in Aves*,

Via Gastone Rossi, 12, Apartment 4 – 40138 – BO
+39 3349742698 • *mirko.martini3@unibo.it*