ALEKSANDRA MARCONI

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Citizenship: Polish (EU)

PROFILE

My main research interests involve advancing our understanding of the evolution of animal development. In my PhD and postdoctoral research, I focus on investigating how the variability of genetic and developmental processes of embryogenesis contribute to the morphological trait diversification of vertebrates.

EDUCATION

University of Cambridge - PhD in Zoology Oct 2018 - May 2023
Part of 1+3 Wellcome Trust PhD Programme in Developmental Mechanisms
Project: "Evolution and development of neural crest cells in East African cichlid fishes"
Supervisor: Dr M. Emília Santos

University of Cambridge - MPhil in Developmental Biology 2017 - 2018
Part of 1+3 Wellcome Trust PhD Programme in Developmental Mechanisms Grade : Pass
Supervisors: Prof Eric Miska (Gurdon Insitute), Dr Èlia Benito-Gutierrez and Dr J. Andrew Gillis (Department of Zoology)

University of Edinburgh - BSc (Hons) in Evolutionary Biology 2013 - 2017
Honours project: "Evolution of nematode mitochondrial genomes" Grade : First Class
Supervisor: Prof Mark Blaxter

RESEARCH EXPERIENCE

Postdoctoral Research Project *University of Cambridge, UK* June 2023 - Present

· Project "Developmental and genetic architecture of brain evolution during ecological divergence in East African cichlid fishes"

PhD project *University of Cambridge, UK* Oct 2018 - April 2023

· Key achievements: Upon joining a newly established group, I contributed to setting up and optimising multiple protocols for cichlid embryos. Over the years, I helped to train other members of the group and made contributions to their own projects. Finally, my PhD project, focusing on the development of the neural crest in cichlids, has established a new research direction in the lab and, more broadly, in the field of cichlid evolutionary developmental biology, providing new insights into the role of neural crest evolution in diversification of cichlids and other vertebrates.

· Part of the project in collaboration with Dr G. Vernaz (Salzburger Lab, University of Basel, Switzerland)

Graduate Industry Placement *Cytiva, Cambridge, UK* April - October 2022

· Prestigious 6-month internship funded by the Medical Research Council & Wellcome Trust

· Project: "Vitrification - preservation of life at -140°C" Supervisor: Dr Peter Kilbride

· Key achievements: Working in a small team of scientists, my main role was to optimise the application of a prototype equipment for cryopreservation of animal tissues at ultra low temperatures. By identifying several limitations, proposing and testing potential improvements, my ideas were implemented into the operating protocol, altogether considerably advancing the ongoing verification and validation work on the prototype.

MPhil rotation projects *University of Cambridge, UK* Oct 2017 - July 2018

· Three 10-week projects undertaken in different research groups

· Pursued themes included miRNA evolution in (1) cichlid fishes and (2) cephalochordates and (3) mechanisms of cartilage regeneration in cartilaginous fishes. The latter project resulted in a first author publication.

Amgen Scholars Program *University of Cambridge, UK* July - August 2016

· Highly competitive (7% acceptance rate) research program for final year undergraduates

· Project: "Characterisation of differentially expressed transcripts in relation to morphological differences in cephalochordate" Supervisor: Dr È lia Benito-Gutierrez

Research Assistant *IIMCB in Warsaw, Poland* June 2016

· Zebrafish Developmental Genomics lab

· Main responsability: optimisation of a genotyping protocol for transgenic zebrafish.

Undergraduate internship *IIMCB in Warsaw, Poland* June - August 2015

· Zebrafish Developmental Genomics lab Supervisor: Dr Michal Pawlak

PUBLICATIONS

A Marconi, CZ Yang, S McKay, ME Santos. 2023. Morphological and temporal variation in early embryogenesis contributes to species divergence in Malawi cichlid fishes. *Evolution and Development.*

B Clark, J Elkin, **A Marconi**, GF Turner, AM Smith, D Joyce, EA Miska, SA Juntti, ME Santos. 2022. Oca2 targeting using CRISPR/Cas9 in the Malawi cichlid *Astatotilapia calliptera*. *Royal Society Open Science* (9): 4.

È Benito-Gutiérrez, G Gattoni, M Stemmer, SD Rohr, LN Schuhmacher, J Tang, **A Marconi**, G Jékely, D Arendt. 2021. The dorsoanterior brain of adult amphioxus shares similarities in expression profile and neuronal composition with the vertebrate telencephalon. *BMC Biology* 19 (1), 1-19.

A Marconi, A Hancock-Ronemus, JA Gillis. 2020. Adult chondrogenesis and spontaneous cartilage repair in the skate, *Leucoraja erinacea*. *Elife* 9, e53414.

PH Schiffer, EGJ Danchin, AM Burnell, CJ Creevey, S Wong, I Dix, G O'Mahony, BA Culleton, C Rancurel, G Stier, EA Martínez-Salazar, **A Marconi**, U Trivedi, M Kroiher, MAS Thorne, E Schierenberg, T Wiehe, M Blaxter. 2019. Signatures of the evolution of parthenogenesis and cryptobiosis in the genomes of panagrolaimid nematodes. *iScience* 21, 587-602.

M Pawlak, KZ Kedzierska, M Migdal, K Abu Nahia, JA Ramilowski, L Bugajski, K Hashimoto, **A Marconi**, K Piwocka, P Carninci, CL Winata. 2019. Dynamics of cardiomyocyte transcriptome and chromatin landscape demarcates key events of heart development. *Genome Research* 29 (3), 506-519.

RESEARCH SKILLS

Histology	Tissue preservation in paraformaldehyde and by snap-freezing Paraffin and OCT embedding Microtome and cryostat sectioning H&E, Masson's trichrome, cartilage and bone staining Chromogenic and fluorescent (HCR) *in-situ* hybridisation in section and whole-mount
Experimental embryology	Generation of zebrafish and cichlid transgenic lines with Tol2 and CRISPR-Cas9 technologies and embryo microinjection
Microscopy	Experienced user of stereo-, transmitted light and confocal microscopes (fluorescent and brighfield)
Cell culture	Aseptic techniques for mammalian cell lines and primary cells derived from rat and mouse organs Cell count and viability assays

RESEARCH SKILLS - *CONTINUED*

NGS techniques	Library preparation for miRNA-seq, RNA-seq and ATAC-seq Data analysis of miRNA- and RNA-seq
Molecular biology	Isolation and analysis of animal and bacterial DNA and RNA, cloning, PCR, qPCR, RT-PCR Antibody staining and EdU incorporation assay
Quantitative analyses	2D and 3D geometric morphometrics Modelling of 3D gene expression domains from confocal data
Animal models	Zebrafish and cichlid embryo and adult husbandry Processing of amphioxus (*Branchiostoma* spp.) and little skate (*Leucoraja erinacea*) tissues

PRESENTATIONS AND TALKS

Cichlid Science Conference (2022) *"Exploring variation in neural crest development in Malawi cichlids"* (talk)

Cambridge Morphogenesis Seminar Series (2022) *"Exploring variation in NC development in East African cichlids"* (invited talk)

Euro Evo-Devo '22 Conference in Naples, Italy (2022) *"Exploring variation in NC development in Lake Malawi cichlids"* (poster)

Developmental Morphometrics Meeting (2021) *"3D morphometric analysis of NC development in East African cichlids"* (invited talk)

Cichlid Science Conference (2021) *"Variation in neural crest development and morphological diversity of cichlids"* (talk)

BSDB/GenSoc Joint Spring Meeting (2021) *"Cellular and developmental basis of pigmentation in East African cichlids"* (poster)

St. Edmund's College Student Conference (2019) *"How do fish get their stripes?"* (talk)

AWARDS AND SCHOLARSHIPS

St. Edmund's College Travel Award (2022) - *Travel costs for Euro Evo-Devo '22 Conference*

Cambridge Philosophical Society Travel Grant (2022) - *Conference fees for Euro Evo-Devo '22*

Art Exhibition Prize at the BSDB/Genetics Society Joint Meeting (2021)

St. Edmund's College Studentship (2021) - *Additional PhD funding*

Cambridge Philosophical Society Research Studentship (2020) - *Additional PhD funding*

British Society for Developmental Biology (BSDB) Travel Grant (2020)

Georges Lemaître Award for the Best Presentation at St. Edmund's College Student Conference (2019)

1+3 Wellcome Trust PhD in Developmental Mechanisms (2017) - *Full MPhil and PhD funding*

COURSES

3D Geometric Morphometrics course by Transmitting Science (2021)

Climate Change Genomics: Vulnerability, Adaptations and Applications workshop by British Ecological Society (2022)

LANGUAGES AND IT SKILLS

Languages	English (fluent), French (C1 - advanced), Polish (native)
IT	Adobe Photoshop, GraphPad Prism, Imaris, MS Office suite, R (basic level)

SUPERVISION AND TRAINING EXPERIENCE

Achira Karunaratna-Mudiyanselage, MPhil student, University of Cambridge (Oct 2022 - July 2023)

Iryna Buriak, new research scientist, Cytiva (May - Oct 2022)

Cassandra Yang, MPhil student (rotation), University of Cambridge (Jan - Aug 2021)

Sam McKay, MPhil student, University of Cambridge (Oct 2020 - Aug 2021)

Elio Escamilla, Erasmus+ student, University of Cambridge (July - Aug 2019)

INTERESTS AND ACTIVITIES

When I am not in the lab, I enjoy practicing Jivamukti yoga and film photography. I am also involved in development of *Carbon Diet*, a card game about the impact of the food sector on climate change.

REFEREES

Dr M. Emília Santos
PhD supervisor

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