

INFORMAZIONI PERSONALI

Matteo Tommaso (i) Ungaro (ii)

I completed my Bachelor in Biology at The University of Padova, where I graduated under the supervision of Prof. Telmo Pievani with a thesis on the evolution of symbolic thought in *H. sapiens* and *H. neanderthalensis*.

I later moved to Australia, where I earned my Master's Degree in Zoology at The University of Western Australia, supervised by Prof. Phil Withers and Assoc. Prof. Jan Hemmi. My research focused on a novel approach to study animal coloration, making use of the great potential offered by the field of Computational Biology. In particular, I analysed dorsal and ventral pigmentation patterns of *M. horridus* to design a system for individual identification and for exploring the possibility of geographic/environmental variation.

BIO

I have concluded my Ph.D. at The University of Ferrara, working on a project in Population Genetics and Bioinformatics. The objective of this study has been to quantify human genetic diversity leveraging a more representative and inclusive paradigm in the field of Genetics and Genomics, the pangenome. Recent advances in theoretical frameworks and algorithmic approaches made pangenomes a viable alternative to the linear reference. Additionally, the current human pangenome enabled detection and characterization of numerous loci and genetic markers previously inaccessible or poorly represented; I have exploited this information to infer demographic models of past human migrations.

At the present time, I'm a postdoc at The University of Ferrara, contributing to the development of a pipeline for the assembly, pangenome construction and variant calling of different accessions of the white lupine (*L. albus*); the graph will be instrumental for various purposes, such as understanding the genetics of local adaptations for the many cultivars in the Mediterranean basin but also assessing genes expression, methylations patterns and source population(s) towards their improvement as agronomically relevant crops.

OCCUPAZIONE PER LA QUALE
SI CONCORRE

Postdoctoral fellowship

ESPERIENZA
PROFESSIONALE

SEP 2024 – present

Postdoc

The University of Ferrara – Italy

1. haplotype-resolved assemblies of 16 individual genomes (eight wild type, and eight land races) from PacBio HiFi and short-read Hi-C evidence
2. graph construction from the 16 individuals with minigraph-CACTUS, reads alignment for ~300 cultivars by vg haplotype and highly accurate variant calling using Deep Variant
3. preliminary checks on assemblies' contiguity, completeness, and correctness; graph's properties and features; downstream analyses

AUG 2022 – OCT 2023

Attività o settore Higher education

Visitor Exchange

The University of California Santa Cruz – USA

1. comparing aspects inherent performance assessment in small and structural variants calling and genotyping, respectively between pangenomes and genome graphs (collab. TGen)
2. design and development of a pipeline for adapting Giraffe-DV to the PGGB graph topology and subsequent benchmark/evaluation
3. SVs benchmarking and evaluation for the contextual publication of the subsampling strategy on Personalized Pangenome References

MAR 2018 – JAN 2020

Attività o settore Higher education

Research Assistant

The University of Western Australia – Perth

1. implementation of a methodology for studying patterns in *M. horridus*
2. image registration and normalization with appropriate MATLAB scripts
3. database management and statistics performed in MS Excel
4. data analysis for geographic variables with R clustering
5. ongoing work for the publication of the study

6. presentation and discussion of the results

Attività o settore Higher education

ISTRUZIONE E FORMAZIONE

MAR 2021 – SEP 2024

Ph.D. in Genetics and Evolution

8

The University of Ferrara — via Fossato di Mortara, 27 – 44121 Italy

- integrated workflow to build and use pangenome graphs for reads alignment and variant calling, applied to the SGDP dataset, for answering explicit questions pertinent to human demography and evolution.
- Acquisition of foundational knowledge in graph theory, data structures and benchmarking experiments
- Contributing to near-future crucial advancements in the use and versatility of pangenome graph pipelines

FEB 2016 – MAR 2018

M.Sc. in Zoology

7

The University of Western Australia — 35 Stirling Highway, 6009 Australia

- The course program, a Master by Thesis and Coursework of which 25% of the total credits were based on a research project, has been completed with a commendable distinction.
- Design of a methodology for studying patterns in *M. horridus* making of use MATLAB v.r2016a combined with the MS Office Package and R for the analysis, presentation, and discussion of the results.

SEP 2010 – SEP 2014

B.Sc. in Biology

6

The University of Study of Padova — via Ugo Bassi 58/b – 35121 Padova

- Over the course of my undergraduate studies, I had the occasion to attain specific education on a wide range of subjects related to Biology.
- Literature study on how *H. sapiens* behavioral patterns and their evolution might have been the key feature of our success as species.

COMPETENZE PERSONALI

Lingua madre

Italiano

Altre lingue

COMPRESIONE		PARLATO		PRODUZIONE SCRITTA
Ascolto	Lettura	Interazione	Produzione orale	
C2	C2	B2	B2	C1
Sostituire con il nome del certificato di lingua acquisito. Inserire il livello, se conosciuto				
Inserire il livello	Inserire il livello	Inserire il livello	Inserire il livello	Inserire il livello
TOEFL iBT. Overall C1 within the CEFR framework.				

Livelli: A1/A2: Utente base - B1/B2: Utente intermedio - C1/C2: Utente avanzato
[Quadro Comune Europeo di Riferimento delle Lingue](#)

Competenze comunicative

- Strong reading, writing, and speaking competencies for English and Italian

Competenze organizzative e gestionali

- Interpersonal and written communication
- Academic research
- Workplace and time management
- Cooperation and conflict resolution
- Analytical thinking

Competenze professionali

n/a

Competenze digitali

AUTOVALUTAZIONE				
Elaborazione delle informazioni	Comunicazione	Creazione di Contenuti	Sicurezza	Risoluzione di problemi
Advanced user	Advanced user	Advanced user	Intermediate user	Intermediate user

Livelli: Utente base - Utente intermedio - Utente avanzato

[Competenze digitali - Scheda per l'autovalutazione](#)

Sostituire con il nome dei certificati TIC

- MS Office
- MathWorks
- ArchGIS/QGIS
- ADOBE Photoshop, Illustrator and Premiere Pro

Altre competenze

- BASH, R and Python coding
- LaTeX document typesetting

Patente di guida

B

ULTERIORI INFORMAZIONI

Pubblicazioni
 Presentazioni
 Progetti
 Conferenze

- J. Sirén, P. Eskandar, **M. T. Ungaro**, et al., "Personalized pangenome references," *Nature Methods*, pp. 1–7, 2024. doi: [10.1038/s41592-024-02407-2](https://doi.org/10.1038/s41592-024-02407-2).
- n/a
- **M. T. Ungaro**, A. Benazzo, S. Ghirotto, M. T. Vizzari, and G. Barbujani, "Pangenome-based demographic inference of human populations," 2024, Poster presented at the International Genome Graph Symposium 2nd edition, Ascona, Switzerland.
- **M. T. Ungaro**, A. Benazzo, S. Ghirotto, M. T. Vizzari, and G. Barbujani, "Pangenome-based demographic inference of human populations," 2024, Poster presented at the Italian Society for Evolutionary Biology 10th biannual congress, Naples, Italy.
- **M. T. Ungaro**, S. Ghirotto, and G. Barbujani, "Pangenome, SV and PopGen: an integrated approach to study human genetic variation," 2022, Poster presented at the International Genome Graph Symposium 1st edition, Ascona, Switzerland.
- **M. T. Ungaro**, P. Withers, and H. Jan, "Identifying the devil: a new approach to animal photographic identification," 2019, Talk presented at the Australian and New Zealand Society for Comparative Physiology and Biochemistry 36th annual conference, Perth, Australia.
- *Memphis Pangenomics 2023 (MemPanG23) Workshop*. Awarded by University of Tennessee, Memphis.
- *International Congress of Zoology (IGZ) 23rd Edition*. Awarded by University of Cape Town, Cape Town.

Seminari

Riconoscimenti e premi
 Appartenenza a gruppi /
 associazioni
 Referenze

Menzioni

Corsi

- n/a
- n/a
- n/a
- n/a
- **Python for Scientific Computing**. Awarded by CINECA, Rome.
- **High Performance Bioinformatics**. Awarded by CINECA, Rome.
- **Introduction to Python Programming**. Awarded by CINECA, Rome.
- **Introduction to Parallel Computing with MPI and OpenMP**. Awarded by CINECA, Rome.

Certificazioni

- Higher Degree Certification - Deep Learning

ALLEGATI

n/a

Dati personali Autorizzo il trattamento dei miei dati personali ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali".

Il sottoscritto dichiara di essere consapevole che il presente *curriculum vitae* sarà pubblicato sul sito istituzionale dell'Ateneo, nella Sezione "Amministrazione trasparente", nelle modalità e per la durata prevista dal d.lgs. n. 33/2013, art. 15.

Autorizzo la pubblicazione del mio curriculum vitae e il trattamento dei dati personali in esso contenuti in base all'art. 13 del D. Lgs. 196/2003 e all'art. 13 GDPR 679/16