



UNIVERSITÀ
CATTOLICA
del Sacro Cuore



EAAP
European Federation
of Animal Science



Funzione Formazione Post laurea & Research Partnership

Formazione permanente Piacenza-Cremona

SUMMER SCHOOL

Livestock pangenomes: how to construct and exploit whole genome information.

2024 EDITION





Course Presentation:

Discover what a pangenome is, learn the basics of constructing and using a pan-genome, and then explore the potential future applications of pangenomes that may open new research opportunities.

The School is aimed at advanced PhD students, post-docs and scientist researching genome structure and function, genetic diversity and applying genomic techniques to understand phenotypic variation. A sound knowledge of Unix/Linux is required.

The School will have theoretical classes and practical sessions to enable students to learn and apply the techniques that are taught and will include examples and demonstration. Tutors at the School are leading experts in pan-genome construction, annotation, and applications.

The School will be held in English at the Università Cattolica del Sacro Cuore in Piacenza Italy between 21st and 27th July. Further information can be obtained on the website ([click here for the website](#)) or by contacting pangenome.summerschool@unicatt.it

To enroll:

1. Access the registration process [click here](#) for registration process.
2. Click on "REGISTER"
3. Complete the form with the data requested and then click "Register."
4. You will receive an email confirming the creation of your university account.
5. You can now proceed with the payment online.

Should you have any issue in the registration process, please contact us.

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CALENDAR OF CLASSROOM MEETINGS

DAY 1 – SEQUENCE DATA PRODUCTION

MONDAY JULY 22	TIMING	COURSE TOPIC	
MORNING	8.30am - 9.15am	Welcome and introduction to the course.	Paolo Ajmone-Marsan
	9.15am - 11.00am	Sequencing technologies	Andre Eggen Andrea Talenti Massimo Delledonne
	11.00am - 11.30am	Coffee Break	
	11.30am - 12.30am	The bean Pangenome.	Massimo Delledonne
	12.30am	Lunch	
AFTERNOON	2:00pm - 2:45pm	An example of integrated platform: the National Facility for genomics at the Human Technopole.	Clelia Peano
	2:45pm - 3:30pm	The human pangenome.	Davide Bolognini
	3:30pm - 4:00pm	Coffee Break	
	4:00pm - 6:00pm	Practical: Handling different data types, quality checking and preparing data files.	Barbara Lazzari Matilde Passamonti Paolo Cozzi Stefano Capomaccio
	7:30pm	Dinner	



DAY 2 – PANGENOME ASSEMBLY AND VISUALIZATION

TUESDAY JULY 23	TIMING	COURSE TOPIC	LECTURER
MORNING	8.30am – 10.30am	Pangenome assembly methods and graphical representation. Description of software available for pangenome assembly, running assembly software visualization tools.	Alex Leonard
	10.30am – 11.00am	Coffee Break	
	11.00am – 12.30am	Continuation.	Alex Leonard
	12.30am	Lunch	
AFTERNOON	2:00pm – 6:00pm	Practical: Hands on pangenome assembly of a chromosome.	Alex Leonard
	7:30pm	Dinner	

DAY 3 – VISUALIZATION CONTINUED AND ASSESSMENT

TUESDAY JULY 24	TIMING	COURSE TOPIC	LECTURER
MORNING	8.30am – 10.30am	Assessment of the pangenome: Identification of assembly errors, finding rogue sequences, quality metrics, assessment of completeness of the pangenome	Alex Leonard
	10.30am – 11.00am	Coffee Break	
	11.00am – 12.30am	Quality check, error identification and correction of pangenomes	Alex Leonard Marco Milanese Mario Barbato Stefano Capomaccio
	12.30am	Lunch	
AFTERNOON	2:00pm – 3:30pm	Identification of divergent sequence: Analysis of Pangenomes, identification of large variations, insertions and single nucleotide polymorphisms	Alessandra Stella Éric Coissac



	4:00pm – 6:00pm	Practical: Identification of INDELS, CNVs SNPS	Alex Leonard, Marco Milanesi, Mario Barbato, Alessandra Stella
	7:30pm	Dinner	

DAY 4 – USE OF PANGENOME INFORMATION 1

THURSDAY JULY 25	TIMING	COURSE TOPIC	LECTURER
MORNING	8:30am – 10:30am	Alignment of short read sequences to the pangenome.	Barbara Lazzari Giovanni Chillemi
	10:30am – 11:00am	Coffee Break	
	11:00am – 12:30am	Practical Aligning sequences (WGS, exome sequences, RNAseq) to a pangenome.	Barbara Lazzari Marco Milanesi Mario Barbato Alessandra Stella
	12:30am	Lunch	
AFTERNOON	2:00pm – 3:30pm	Beyond the Single Reference: Annotating genes across the PanGenome	Francesca Tricomi
	3:30pm – 4:00pm	Coffee Break	
	4:00pm – 6:00pm	Practical I - Accessing pangenome gene and transcript annotation using Ensembl	Louisse Mirabueno
	7:30pm	Dinner	



DAY 5 – USE OF PANGENOME INFORMATION 2

FRIDAY JULY 26	TIMING	COURSE TOPIC	LECTURER
MORNING	8.30am – 10.15am	Functional variant hunting, examples in livestock	Alex Leonard
	10.15am – 10.45am	Coffee Break	
	10.45am – 12.30am	Functional variant hunting, examples in plants.	Michele Morgante
	12.30am	Lunch	
AFTERNOON	2:00pm – 3:30pm	Practical: Using a pangenome to Identify a known functional variant.	Alex Leonard Alessandra Stella
	3:30pm – 4:00pm	Coffee Break	
	4:00pm – 6:00pm	Practical: Using a pangenome to Identify a known functional variant.	Alex Leonard Alessandra Stella
	7:30pm	Dinner	

DAY 6 – CONCLUSION

SATURDAY JULY 27	TIMING	COURSE TOPIC	LECTURER
MORNING	8.30am – 10.30am	Future Directions: Emerging trends and future directions and applications of pangenomics in livestock. Ethical considerations and challenges.	Riccardo Negrini Jonh Williams
	10.15am – 10.45am	Coffee Break	
	10.45am – 12.30am	Course Conclusion and Certificates	Paolo Ajmone-Marsan