

BREEDTECH project: 1st Student Training Workshop

5th to 9th May 2025. Venue: Aula 6, Main building, Scuola Superiore Sant'Anna Pisa, Italy

TITLE: ADVANCED APPLICATIONS OF GENETICS AND GENOMIC TOOLS in CROP IMPROVEMEN

Day	Time	Activity	Facilitator(s) and trainers
Monday 5 th May 2025	9:00-9:30am	<ul style="list-style-type: none"> Registration Welcome, introductions of ISP/SSSA and the training team Ice-breaker: "Tour the Table" – sharing student backgrounds and interests Summarize the course content and week activities 	Facilitator: Matteo Dell'Acqua <ul style="list-style-type: none"> Registration Institute of Plant Science (ISP) Director: Prof. Matteo Dell'Acqua
	9:30 – 10:30 am	Lecture 1 <ul style="list-style-type: none"> Basic concepts in genetics; molecular aspects of DNA as genetic material 	Mario Enrico Pè
	10:30-10:45 am	Group photo	
	10:45-11.00am	Coffee Break	
	11:00- 12:30 pm	Lecture 2 <ul style="list-style-type: none"> Genetics continued 	Mario Enrico Pè
	12:30-1:00pm	Questions and Discussion	Mario Enrico Pè
	1:00 -2.00pm	Lunch break	
	2.00-3.00pm	Lecture 3 <ul style="list-style-type: none"> Molecular markers and genetic maps 	Mario Enrico Pè
	3.00-4:00pm	Lecture 4 <ul style="list-style-type: none"> Principles of genomic DNA extraction (keep in mind extraction will follow the day after) PCR, and electrophoresis 	Ettore Riccucci

	4:00-4:30pm	Lecture 5 <ul style="list-style-type: none">Laboratory safety	Afewerki Kiros Martina Sechi
End of day 1			
Tuesday 6 th May 2025	9:00 -9:30 am	<ul style="list-style-type: none">Arrival at the labPPE, protocol distributionLaboratory tour and instruction (safety)	Facilitator: Martina Sechi Ettore/Martina/Afi (3-4 students in each group)
	9:30- 11:00am	<ul style="list-style-type: none">Hands-on practical: Genomic DNA extraction from plant tissue using Qiagen kit	Ettore/Martina/Racheal
	11:00- 11:15am	Coffee break	
	11:15-1:00pm	PCR set up and run	Ettore/Martina/Racheal
	1:00pm-2:00pm	Lunch break	
	2:00-3:30pm	Set up gel electrophoresis	Ettore/Martina/Racheal
	3:30-4:30pm	Run DNA and PCR products	Ettore/Martina/Racheal
	4:30-5:00pm	Check gels under UV	Ettore/Martina/Racheal
End of day 2			
Wednesday 7 th May 2025	9:00 -10: 30 am	Discuss DNA and PCR results and present the results	Facilitator: Svenja Mager Ettore/Martina/Racheal
	10:30-11:00am	Coffee Break	
	11:00am-13:00	Lecture 6 <ul style="list-style-type: none">Basic concepts in genomicsStructure of a plant genome (genes, TEs, repeats)Transcriptomics	Svenja Mager
		<ul style="list-style-type: none">Sequencing tech: Illumina and ONT	Svenja
	1:00-2:00pm	Lunch break	

	2:00-3:30pm	Lecture 7 student seminars <ul style="list-style-type: none">Discussion: Applications, limitations, and advancements in sequencing platformsCase study presentation	Svenja Mager Case study 1- Tobias Recha Case study 2 - Bedasa Mekkonen
	3:30-4:00pm	<ul style="list-style-type: none">Questions and Discussion	Afewerki Kiros
	4:00-4:30pm	Prepare computers for Thursdays hands on. <ul style="list-style-type: none">Software download: TasselDemo Dataset download	Ettore/Afewerki/Tobias
	End of day 3		
Thursday 8 th May 2025	9:00 – 10:30am	Lecture 8 <ul style="list-style-type: none">Introduction to population genomics, allele/genotype frequencies, and evolution.GWAS	Facilitator: Afewerki Kiros Matteo Dell'Acqua
	10:30-11:00am	Coffee break	
	11:00-1:00pm	Data analysis <ul style="list-style-type: none">Hands-on practical: Using TASSEL for GWAS and data analysis.	Leonardo, Ettore, Afewerki
	1:00-2.00pm	Lunch break	
	2:00-4:00pm	Data analysis- continued	Leonardo, Ettore, Afewerki
	4:00-4:30pm	Discussion and wrap up	Leonardo Caproni
	5:30 - onwards	Dinner /Pizza / networking	
	End of day 4		
Friday 9 th May 2025	9:00-10:00am	Lecture 9 <ul style="list-style-type: none">Framing GWAS and genomics in breeding pipelines.	Facilitator: Matteo Dell'Acqua Matteo Dell'Acqua
	10:00-10:30am	Coffee break	

	10:30- 11:30pm	Lecture 10 <ul style="list-style-type: none"> Introduction to genome editing tools (e.g., CRISPR/Cas9). 	Leonardo Caproni
	11:30-12:30pm	Case study <ul style="list-style-type: none"> Paper presentation on CRISPR use in crop improvement 	Leonardo Caproni
	12:30-1:00pm	Questions and Discussion	Matteo, Leonardo, Afewerki, Ettore, Svenja
	1:00-2:00pm	Lunch break	
	2:00-3:00pm	Course wrap-up: Interactive group discussion, feedback, and takeaways	Matteo, Leonardo, Afewerki, Ettore, Svenja
	3:00-4:00pm	Assessment and certificate awards.	Matteo Dell'Acqua
End of day 5 and departure			