JACOPO ALLEVI

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Project title: Predicting seed quality through multimodal investigation

Supervisor: Prof. Macovei Anca (anca.macovei@unipv.it)
Reviewer: Prof. Balestrazzi Alma (alma.balestrazzi@unipv.it)

Academic training:

10/2026 – Ongoing	PhD student in Genetics, Molecular and Cellular Biology, Department of Biology and Biotechnology "L. Spallanzani", University of Pavia, XLII Cycle
09/2023 – 07/2025	Master's Degree in Molecular Biology and Genetics (Molecular and Digital Biology), University of Pavia – Final grade: 110/110 cum laude
09/2020 – 10/2023	Bachelor's Degree in Biological Sciences (Scienze Biologiche), University of Milan – Final grade: 100/110
09/2016 – 07/2020	Higher Technical Institute (ITS) Diploma in Chemistry and Materials, I.S. Archimede (24047, Treviglio (BG), Italy)

Research experience:

03/2026 - 09/2026 Research Fellowship

Molecular and computational insights into seed quality determinants

Research fellowship conducted at the Plant Biotechnology lab, University of Pavia, under the supervision of Prof. Anca Macovei (anca.macovei@unipv.it). The activity focused on: (i) morpho-psychological characterization of edited maize lines; (ii) high-throughput data analysis from a seed phenotyping platform, encompassing germination kinetics and morphological parameters; (iii) development of a prototype tool for automated morphological measurement from seed scans (SEMEasure); (iv) exploratory testing of HYDRA as a non-invasive imaging approach for seed quality characterization, with the aim of evaluating its integration potential within existing high-throughput phenotyping workflows.

08/2025 - 12/2025 Erasmus+ Trainee

Multispectral imaging and physiological assessment of seed quality after harvest, aging, and storage

Internship conducted at the Department of Agroecology - Crop Biogenetics and Biotechnology, Aarhus University, under the supervision of Dr. Fiona Hay (fiona.hay@agro.au.dk) and Dr. Asma Moeinzadeh (asmamoein@agro.au.dk). The work focused on the extraction and analysis of multispectral imaging data from seeds belonging to five plant species and multiple varieties/species. In parallel, work dedicated to determine the moisture sorption isotherms of naked and pilled celery seeds using non-saturated LiCl solutions to establish controlled relative humidity conditions, was conducted.

05/2024 - 07-2025 Master's degree internship

Assessment of seed quality in local maize varieties through volatile organic compounds profiling

Internship conducted at the Plant Biotechnology lab, University of Pavia, under the supervision of Prof. Anca Macovei (anca.macovei@unipv.it) and part of the NODES PNRR project, funded by the European Union – NextGenerationEU, in collaboration with Phen-Italy and Universita' Cattolica del Sacro Cuore (Piacenza). The project revolved around VOC (volatile organic compounds) profiling in 19 local maize varieties and their correlation with germination performance under optimal and drought stress conditions imposed in a soil setting. In parallel, seed phenotypic traits (e.g., weight, size, area, color) were processed using imaging-based approaches (ImageJ software). At a molecular level, the expression profiles of genes involved in key VOCs release pathways are measured through quantitative RealTime PCR. The obtained data are being used for the preparation of a dedicated article.

Technical skills:

Bioinformatics: oligonucleotide design, R for data analysis and bioinformatics (modeling, statistical inference and tests, data manipulation, RNA data resequencing, variant calling and prioritization), basic BASH for data manipulation and omic sequences analysis, molecular structure analysis and ligand docking (PyMOL and Coot, basic Gromacs, AutoDoc and Vina), phylogenesis analyses (online tools, Iqtree), imaging data extraction, analysis and manipulation (VideometerLab and VideometerCdt softwares, ImageJ, GrainScan)

Plant physiology: seed germination, moisture sorption isotherm determination, biometric measurements, soil-drought germination system

Biochemistry: FOX-1 for ROS release determination

Molecular biology: nucleic acid extraction, quantitative real time PCR (qRT-PCR), gel electrophoresis.

Publications:

Wazeer H, Zeidan A, **Allevi J**, Pagano A, Conrado D, Marocco A, Stagnati L, Doria E, Macovei A. Seed priming with plant waste extracts enhances maize drought tolerance in a genotype-specific manner. *Frontiers in Plant Science* **2025**, 16:1717255. DOI: https://doi.org/10.3389/fpls.2025.1717255

Honors and awards:

Best Oral Presentation Award at the Mini-symposium "Learning with Seeds – Basic, Translational & Applied Science"; 6 June 2025, Pavia, Italy.

Conference contributions and presentations:

Allevi J. Investigating morphology, germination performance, and VOCs profiling as potential indicators of maize seed quality. Mini-symposium "Learning with Seeds – Basic, Translational & Applied Science", University of Pavia, department of Biology and Biotechnology, June 6, 2025, Pavia, Italy. Oral presentation.

Wazeer H, Zeidan A, **Allevi J**, Doria E, Buonocore D, Marocco A, Macovei A. Seed priming strategies for improving maize germination under drought. Plants 2025: From Seeds to Food Security Conference (https://sciforum.net/event/Plants2025); March 31 – April 2, 2025, Barcelona, Spain.

Bosco N, Abashidze N, **Allevi J**, Pagano A, Dueñas C, Bassolino L, Ugolini L, Montanari M, Paris R, D'Esposito D, Ruocco M, Monti, M.M, Loreto F, Moeinzadeh A, Hay F, Balestrazzi A, Macovei A. Integrative high-throughput phenotyping and molecular analyses reveal novel insights into hemp seed quality. 69th SIGA Annual Congress "Genetic Blueprints for Next Generation Crops"; September 8 – 11, 2026, Rome, Italy.

Dueñas C, Sibusisiwe N, Ricotti A, Guidi E, **Allevi J**, Bedotto N, Baino M, Saluzzo E, Pagano A, Macovei A. Seed morpho-physiological traits and seedling emergence in response to drought in a panel of Italian rice varieties. 69th SIGA Annual Congress "Genetic Blueprints for Next Generation Crops"; September 8 – 11, 2026, Rome, Italy.