

Declaration

In the PhD dissertation of Dario Ruggeri entitled *Reliable Machine Learning for Omics Data: Evaluation Protocols, Hybrid Models, and Applications in Foodomics*, with the list of publications:

[J1] Dario Ruggeri and László Vidács.
Advancing Wheat Single-Nucleotide Polymorphism Data Analysis with Explainable Deep Learning Models.
Applied Artificial Intelligence, 39(1):2565169, 2025.

[J2] Dario Ruggeri, Gabriele Tazza, and László Vidács.
Introducing MLOps to Facilitate the Development of Machine Learning Models in Agronomy: A Case Study.
IEEE Access, 13:122059–122070, 2025.

[J3] Dario Ruggeri and László Vidács.
K-Fold Cross-Validation and Early Stopping in Foodomics Neural Networks: Practices, Pitfalls, and Recommendations.
IEEE Access, 13:190820–190832, 2025.

[J5] Gabriele Tazza, Francesco Moro, Dario Ruggeri, Bas Teusink, and László Vidács.
MINN: A Metabolic-Informed Neural Network for Integrating Omics Data into Genome-Scale Metabolic Modeling.
Computational and Structural Biotechnology Journal, 27:3609–3617, 2025.

[C6] Dario Ruggeri and László Vidács.
Introducing MLOps to Facilitate Reproducible Model Development on Omics Data.
In Proceedings of the 13th International Conference on Simulation and Modelling in the Food and Bio-Industry (FOODSIM), pp. 198–203, 2024.

Dario Ruggeri’s contribution was decisive in the following results:

- For the research presented in [J1], [J3], and [C6], the author was the main contributor. The author was responsible for the project design, the development and implementation of the software and models, the execution of all computational experiments, and the preparation of the manuscripts.
- In the thesis point related to *Research-Stage MLOps for Reproducible Omics Experiments*, the author was the principal contributor and led the design and implementation of a research-stage MLOps workflow for agronomic machine learning studies. The author conceived and implemented the overall experimental design, developed the experiment tracking and evaluation workflow, conducted the experiments, and carried out the analysis related to reproducibility and experiment management. [J2]
- In the thesis point related to *Hybrid Neural Networks as Multi-Objective Systems*, the author was the principal contributor to the methodological development of the hybrid multi-objective framework. The author designed and implemented the multi-task learning formulation, developed the objective balancing strategy and evaluation considerations, and led the methodological investigation of hybrid neural network models integrating mechanistic constraints. [J5]

These results cannot be used to obtain an academic research degree, other than the submitted PhD thesis of Dario Ruggeri.

Date: _____ Signature of candidate: Dario Ruggeri

Signature of supervisor: _____

The head of the Doctoral School of Computer Science declares that the declaration above was sent to all of the coauthors and none of them raised any objections against it.

Date: 10/04/2026

Signature of Head of Doctoral School: _____

