

# William Pozzolini

BIOENGINEER

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## Summary

Biomedical Engineer, currently in my final year of master's degree at the University of Padova (Italy), specializing in data analysis and modeling. I have practical experience using software such as COMSOL Multiphysics for simulation and Python for Machine Learning / Deep Learning. Native speaker of Italian with multilingual skills, including certified proficiency in English (Cambridge CAE) and academic proficiency in French and German.

## Academic and Research Experience

### University of Pescara

Pescara, Italy

#### THESIS WORK

Dec. 2023 - June. 2024

- Developed and validated two distinct finite element models of a human L3 vertebra using **COMSOL Multiphysics** to assess osteoporosis-related fracture risk.
- Engineered a repeatable workflow to segment cortical and trabecular bone from patient CT scans using ITK-Snap, creating patient-specific vertebral geometries.
- Simulated physiological compression loads on both healthy and osteoporotic models, successfully differentiating stress distributions and identifying potential failure points in line with clinical literature.
- Conducted mesh convergence analysis to ensure model accuracy and fidelity, finding a peak Von Mises stress of **0.003 MPa** in the detailed model under physiological loading.

## Projects

### Machine Learning / Deep Learning independent projects

Github

#### PROJECT LEAD

August. 2025 - September 2025

- Developed an end-to-end machine learning pipeline using **Python** (Scikit-learn, Pandas) to predict diabetes from patient health data, achieving **75%** sensitivity and **78%** specificity on an imbalanced dataset.
- Implemented hyperparameter tuning with GridSearchCV and enhanced model interpretability using advanced techniques such as SHAP, Permutation Importance, and Partial Dependence Plots.
- Validated model reliability with learning and calibration curves and prototyped a deployment-ready API endpoint using FastAPI, demonstrating a full production lifecycle awareness.
- Conducted a preliminary cost-benefit analysis based on clinical metrics (PPV, NPV) to project potential healthcare savings. The full project, including code and analysis, is documented on GitHub: [github.com/WPozz/diabetes-prediction-project](https://github.com/WPozz/diabetes-prediction-project).

## Education

### UniPd (University of Padova)

Padova, Italy

#### M.S.C. IN BIOENGINEERING

Sept. 2024 - Oct 2026 (Expected)

- Curriculum: Biomedical Data Analysis and Modeling.
- Key Courses: Neurorobotics, Biosensors, Deep Learning, Signal Processing, Bioimaging, Machine Learning

### UniCh (University of Pescara)

Pescara, Italy

#### B.S. IN BIOMEDICAL ENGINEERING

Sept. 2021 - July. 2024

- Key Courses: Computational Mechanics, Biomaterials and Biodevices, Mechanics of Biological Tissues, Biomedical Instrumentation.

## Skills

#### CODING SKILLS

- Python** (NumPy, TensorFlow, Scikit-learn): Applied in independent projects for data analysis and machine learning, available on my GitHub.
- R** (Caret, GBM) used for Machine learning and data analysis.

#### SOFTWARE

- COMSOL Multiphysics** (FEA modeling and Biomechanics) with thesis work.
- ITK-SNAP** (Medical Image segmentation).
- MATLAB** (data analysis and signal processing)
- Robot Operating System** (ROS)