TP KMA
KMA Technology Platform

Department of Mathematical Analysis and Applications of Mathematics
Faculty of Science
Palacký University Olomouc

Applied mathematics and data science for Horizon Europe

KMA Technology Platform at Palacký University Olomouc

We are seeking to join Horizon Europe consortia that need expertise in classical and Bayesian statistical analysis, applied artificial intelligence (AI), mathematical modelling and optimization.

KMA Technology Platform (TP KMA) connects researchers and students at the Department of Mathematical Analysis and Applications of Mathematics, Faculty of Science, Palacký University Olomouc, Czech Republic, with companies and public institutions. Our team has experience in applied and contract research.

Expertise offered to consortia

- **Study design and statistical inference.** Study and experimental design; planning data collection; data cleaning, visualization and analysis. We use classical and Bayesian statistical methods to analyze relationships in data, make predictions and quantify uncertainty. We have experience in analyzing data in medicine, natural and social sciences, industry, and economics.
- **Artificial intelligence and machine learning.** We develop regression and classification models using neural networks, decision trees, support vector machines and other methods. Our expertise also covers multivariate and high-dimensional analysis (including principal component analysis, factor analysis and clustering), functional and spatial data, time series and stochastic processes. We analyze images, signals and text using statistical and machine learning methods.
- **Industrial analytics and computer vision.** Analysis of production and sensor data; anomaly detection, process diagnostics, predictive maintenance and automated quality inspection. We combine statistical and machine learning methods with the operational knowledge of engineers and technicians.
- **Mathematical modelling and decision support.** Deterministic and stochastic optimization for production, logistics, resource allocation and energy management, including work on advanced planning and scheduling (APS) systems. Multicriteria and group decision-making methods, including fuzzy modelling, support decisions involving risk and uncertainty. We also offer forecasting and modelling of dynamic systems.
- **Training and methodological support.** Tailored training and consultancy in statistics, data science, applied mathematics, machine learning and AI can help project partners interpret results and apply the methods in their own work.

Possible project contributions

Depending on the project, our contribution can include analysis plans, prepared and documented datasets, statistical or predictive models with performance evaluation, optimization algorithms, software prototypes and technical training. We work with partners to define the problem, assess data quality and constraints, select suitable methods and evaluate results against the intended use.

Selected collaboration experience

- **PLASTIKA a.s. and manufacturing analytics.** In the completed TA ČR-funded project FW03010716, the university team contributed to software for detecting anomalies in production process data in real time. The work included bringing together data from different machines and incorporating technicians' expertise into mathematical models. The published case study on TP KMA website reports that the company uses the project results in production.
- **OLAF and household energy management.** In a research and development project scheduled for 2025–2027 with OLC Systems and AgreFlex, TP KMA develops forecasts of photovoltaic generation and household consumption, together with optimization models for energy management. OLC Systems provides the software and hardware infrastructure; AgreFlex contributes energy sector expertise. The October 2026 case study on our website describes pilot validation of the system.
- **TENZOVÁHY and vehicle weighing.** In a research and development project scheduled for 2025–2028, the university team combines computer vision and neural networks to investigate vehicle motion and anomalies affecting weigh-in-motion measurements. The aim is to compensate for measurement deviations associated with effects such as vehicle oscillation or braking.
- **University Hospital Olomouc and health data.** With University Hospital Olomouc, we have worked across multiple fields on statistical analysis and visualization of healthcare data, image processing, metabolomics pipeline, and provided specialist training of the doctors' team.

Partners sought

We are looking for coordinators and research organizations developing proposals in these areas, especially teams with Horizon Europe experience. We also welcome industrial companies and SMEs, technology and software providers, energy system operators, healthcare organizations and public institutions that can contribute domain expertise, relevant data or settings for pilot validation.

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