# Einladung zum Oberseminar Wissenschaftliches Rechnen

Julius-Maximilians-Universität Würzburg
Lehrstuhl für Wissenschaftliches Rechnen IX

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## Gaussian Processes with Missing Inputs: A Kernel Marginalization Approach

Gaussian Process Regression (GPR) is a flexible, non-parametric Bayesian approach to regression, widely used in engineering and the natural sciences for its ability to quantify uncertainty. In our joint project with materials scientists, GPR is applied to predict fatigue strength in steel based on treatment process parameters. The focus of this talk will be on the challenges that arise when some of the input data is missing, a common occurrence in real-world datasets.

After briefly introducing the setup and the role of GPR in the project, I will discuss the core problem: how to perform inference with GPs when some input dimensions are only partially observed. I will outline standard approaches, such as imputation and their limitations. Next, I introduce the idea of marginalizing the kernel function with respect to the distribution of the missing inputs. This method preserves the probabilistic structure of the model and integrates uncertainty about the missing values directly into the kernel, avoiding heuristic imputations.

Ort: Raum 30.02.003 (Mathematik West, 2.Stock) Zeit: Donnerstag, 24.07.2025, 12:00 Uhr

Zu diesem Vortrag laden wir Sie herzlich ein.
You are cordially invited to this lecture.

*gez. Prof. Dr. Alfio Borzì*
*gez. Prof. Dr. Frank Werner*