

University of Wisconsin-Milwaukee

**Dept. of Physics
COLLOQUIUM**

*Next-Generation Gaussian Processes for
Function Approximation, Uncertainty
Quantification, and Decision-Making*

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Gaussian processes (GPs) and Gaussian-related stochastic processes are powerful tools for function approximation, uncertainty quantification, global optimization, and autonomous data acquisition due to their robustness, analytical tractability, and natural inclusion of Bayesian uncertainty estimates. Even so, Gaussian processes are often criticized for poor approximation performance and neck-breaking computational costs in real-life applications. The reason for this gap, however, is not the methodology itself but rather a user-caused lack of flexibility and domain awareness of the underlying prior probability distribution.

In this talk, I address many challenges of GPs that might inhibit optimal performance. We will discover hands-on solutions and tools that make implementation easy. The key takeaway for the audience will be a better understanding of Gaussian processes and ways to customize them for optimal performance.

