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*Gaussian processes with inequality constraints: theory and computation.*

**Tuesday, April 2nd, 2024**

**11:50 AM**

**96 Frelinghuysen Road, CoRE Building, Room 431**

**Zoom Meeting: Meeting ID: 969 0606 4706**

**Password: 745339**

<https://rutgers.zoom.us/j/96906064706?pwd=ZklvbExpRVBJQ3c5dUhhYTFuR2ZrZz09>

**Light refreshments will be served in Hill 452, 11:15am**

**Abstract:** In Gaussian process modeling, inequality constraints enable to take expert knowledge into account and thus to improve prediction and uncertainty quantification. Typical examples are when a black-box function is bounded or monotonic with respect to some of its input variables. We will show how inequality constraints impact the Gaussian process model, the computation of its posterior distribution and the estimation of its covariance parameters. An example will be presented, where a numerical flooding model is monotonic with respect to two input variables called tide and surge.

The talk will follow 3 parts. (1) An introduction to (constrained) Gaussian processes and their motivations in the field of computer experiments will be provided. (2) Theoretical results on the impact of the constraints on maximum likelihood estimation will be provided. (3) Focusing on numerical computations, an algorithm called MaxMod will be presented.

**Bio:** François Bachoc defended his PhD thesis at the University of Paris Diderot in 2013. He then completed a two-year postdoctoral research position at the University of Vienna. Since 2015, he has been a tenured Assistant Professor at the Institute of Mathematics of Toulouse. He obtained his French Habilitation in 2018. His research interests include theoretical and applied statistics, machine learning, and industrial applications.

