Tuesday, October 1st, 16:00-17:00 (B1)

Iñigo Urteaga
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Bayesian modeling and inference for predictive and prescriptive applications

In this talk, I will present some of our recent work on how Bayesian models and approximate inference from the statistics and machine learning community can be used to improve learning and decision making on complex practical scenarios.

First, I will introduce a statistical framework for personalized, accurate, and minimally invasive modeling of female reproductive hormonal patterns. This approach combines the power of Bayesian nonparametric models (i.e., Gaussian processes) with the flexibility of neural networks (i.e., a dilated convolutional architecture) to reconstruct and forecast the evolution of hormonal dynamics over time, while accommodating pragmatic measurement settings.

Second, I will present recent advances on how Bayesian time-varying models and sequential Monte Carlo can be combined to address the challenges of applied problems that are prescriptive rather than predictive. These problems, for which decisions must be sequentially made in order to maximize a reward, are common in health, commerce, and engineering. By leveraging sequential Monte Carlo methods, we show how to extend the multi-armed bandit setting to dynamic and complex scenarios, allowing practitioners to make automated and informed decisions.

About the speaker:

Iñigo Urteaga is an Associate Research Scientist in the Applied Math department at Columbia University and the Data Science Institute. He is currently working on descriptive, predictive, and prescriptive modeling for complex practical scenarios, in collaboration with Prof. Chris Wiggins and Prof. Noémie Elhadad. He has specialized in statistical signal processing, Bayesian Theory, approximate (Monte Carlo and Variational) inference methods, and sequential decision processes. His research focuses not only on the development of Bayesian probabilistic models, but also on their application to a wide range of disciplines.