

## ATENEO



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## ***Ensemble Kalman Methods: Overview and New Developments***

**Abstract:** Ensemble Kalman methods are a rich family of algorithms for sequential data assimilation and numerical solution of inverse problems. This talk will have three parts. First, I will provide a historical overview of ensemble Kalman methods from their development in numerical weather forecasting to their more recent adoption in the inverse problems community. Examples will be provided to illustrate how these methods are implemented in practice, and why they have become increasingly popular over the last decade. Second, I will show some contributions toward understanding ensemble Kalman methods, introducing a unified framework for their design and analysis based on continuum limits and statistical linearization. I will also discuss a novel non-asymptotic analysis that explains the success of ensemble Kalman methods even when deployed with a small ensemble size. Finally, in the third part of the talk, I will show methodological contributions to blend ensemble Kalman methods with machine learning for the co-learning of a time-evolving signal and their dynamics from partial and noisy observations.

**Sala de Grados I, Facultad de Ciencias**  
**Miércoles 8 de Febrero de 2023 (12:00)**

