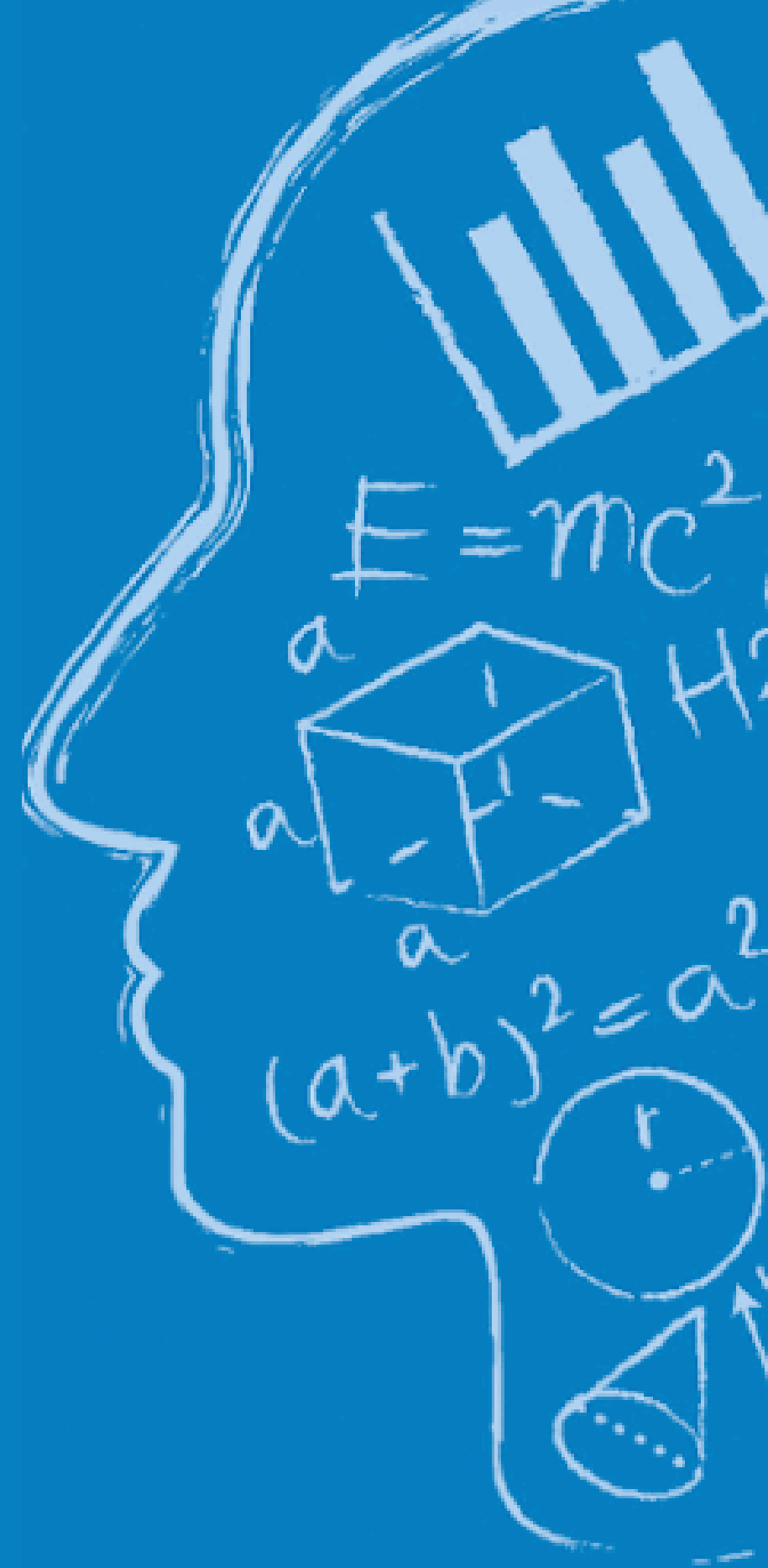


SEMINAR

CEAUL & CEMAT



LARGE SCALE INFERENCE FOR MIXED MODELS

ABSTRACT:

Mixed models are the workhorse of applied Statistics. We are interested in models with additive and multiplicative interactions between random effects and this generates a broad framework that is routinely used for varied tasks such as small area estimation, item response theory, recommender systems and analysis of networks. Two structural properties of these models are a sparse Gaussian distribution for the random effects and a (typically) sparse design matrix.

In modern applications, from political science to electronic marketing, it is common that both the size of the data and the number of random effects are large, hence it is crucial that the cost of computational methods for inference scale scales linearly with respect to those. However, the sparsity in such models is such that popular implementations, such as those in lmer or INLA have polynomial costs. We adopt a Bayesian approach (although the essence of our arguments applies more generally) for inference and design families of variational approximations with provable scalability and guarantees for the resultant approximation error.

In the talk, I will give an accessible introduction to the models and their applications, and to variational inference and will provide some highlights of our main results.



SPEAKER

Omiros Papaspiliopoulos

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Omiros Papaspiliopoulos is a distinguished academic specializing in Statistics, Machine Learning, Stochastic Processes, and Applied Mathematics, focusing particularly on Bayesian computational methods. He is a full Professor in the Department of Decision Sciences at Bocconi University. His research has been widely recognized and published in top journals, including *Biometrika* and the *Journal of the Royal Statistical Society Series B*.

Before joining Bocconi in 2021, Papaspiliopoulos was an ICREA Research Professor at Universitat Pompeu Fabra in Barcelona, where he founded and directed the first Master's in Data Science in Europe at the Barcelona Graduate School of Economics. He also established the Data Science Center there, which he led until 2021. His previous academic roles have included positions at Warwick, Oxford, and Lancaster Universities ([Department of Decision Sciences](#)) ([Bayeslab](#)) (IEP@BU).

In addition to his academic work, he has made significant contributions to the field through his editorial roles, including being a co-editor of *Biometrika* and an Associate Editor of the *Journal of Uncertainty Quantification*. He has also been involved in various outreach activities, promoting the role of data and data sciences in society through presentations to diverse audiences, including high-school students, senior managers in public administration, and the European Commission ([Bidsa](#)).