

PhD program in Statistics

# DSS Statistics Seminar

May 16, 2025, 12:00

**In person** Room 34 (CU002)

**Webinar** <https://uniroma1.zoom.us/j/83625004899?pwd=bXCtz0mp759PUh2lkqT0BUoVa0Uegg.1>

Passcode: 123456

## A Hierarchical Model for Comparing Spectral Patterns in Lemur Vocalization

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In this talk, I will present a hierarchical model designed to analyze the spectrograms of animal vocalizations, with a focus on grunt calls from different lemur species. The primary goal is to uncover a latent spectral shape that characterizes each species and allows us to quantify dissimilarities between them. A key challenge lies in aligning calls of varying durations and temporal dynamics. To tackle this, we incorporate a synchronization function to manage non-stationary temporal features and adopt a circular representation of time to handle artifacts caused by the discretization of analog signals. Given the high dimensionality of spectrogram data, we use a Nearest Neighbor Gaussian Process for efficient computation and sample from the posterior distribution using MCMC. The model is applied to recordings from eight lemur species. For each species, we identify a representative vocal pattern and use a simple distance metric to compare them. Predictive performance is assessed via cross-validation, and we also explore some special cases that highlight the model's flexibility.



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