Ecology and Dependence Project

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Ambition EcoDep Project
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Welcome

Dear all, I first wish to thank you make possible this first Ecodep conference.
I wish to aknowledge:

- the Participants to take the time to attend,
- the Speakers to agree to give a talk,
- the Ecodep Team for making this project possible,
- CY Initiative for funding the project,
- Maxence Grab for developing an attractive web-page.

We also hope that after the pandemic we may meet again physically for a real
conference. And the whole Ecodep team will welcome you soon in France.

Ecodep

The Ecodep project aims at promoting techniques of time series analysis for Ecology purpose;
as well as we will develop specific statistical/probabilistic techniques in order to develop Ecological applications.

Ecodep plans to

- provide initial formation for Master level and PhD students
- describe and understand ecology oriented data sets.
- develop probabilist models of population dynamics
- develop statistical tools for applications.
- implement such tools for applications to ecology.

Content

First I would not pretend I am an ecologist myself but I hope the project can help to develop real Ecology applications thanks to the great team of EcoDep.
Indeed, among the project many colleagues are fortunately more relevant to the project.
The talks are both from ecology or from statistics.
The talks essentially dedicate to a dynamical framework, either in Dynamic of population or in statistics of time series.
Those questions wwill hopefully interact during the whole project. I will try to organize and describe them in this very short presentation.
I want to stress that many items of the project are not included in the talks but they will participate to the final round table.

Now for organisation purpose the Abstracts Book is interactive in order to make it possible direct email exchanges between participants and the talks will be recorded and we will put them online ASAP

Eastern session, September 9

- 9:00-9:15 **Paul Doukhan**. Opening.
- 9:15-10:15 **Sylvie Méléard**. Adaptation to a gradual environment - Research of lineages.
  MMB Chair dedicates to model ecological methods
- 10:15-11:00 **Eric Renault**. Lag-augmented local projections and causality properties at different horizons.
  Causal relations are important to infer interactions of numerous parameters of importance
- 11:00-11:30 **Lionel Truquet**. Times series: exogeneity and random environment.
  Using causality allows to incorporate covariates of importance for modelling ecological networks
- 11:30-12:00 **Michael Neumann**. Multivariate isotonic regression for time series.
  Monotonicity is the character to be determined in order to infer global warming issues.

Western session, September 9

- 15:00-15:45   **Thierry Huillet**. Scaling features of two special Markov chains involving total disasters.
  Such probabilistic models serve as a benchmark in ecological modelling/

- 15:45-16:45   **Pablo Marquet**. Reconstructing complex ecological networks.
  The word reconstruction denotes estimation in the statistical framework.

- 16:45-17:30   **Sergio Navarrette**, The wonderful complexity of coastal marine ecological networks.
  One should refer to the beauty of the nature in order to understand the importance to keep it

- 17:30-18:00   **Yves Lebras**. Bat mortality in wind farms: assessment and mitigation.
  This is an example of a very applied problem important to understand how a protected specie may be preserved

Eastern session, September 10

- 9:00-9:45 **Morgan Mangeas**. New mathematical approaches for modelling dengue fever dynamics at global and local scales.
  Epidemiological issues are considered

- 9:45-10:30 **Pierre Alquier**. Parametric estimation via MMD optimization: robustness to outliers and dependence.
  High dimension time series make use of all the information and incidence of unimportant coordinates is provided automatically; both ideas with causality yield dimension reduction

- 10:30-11:00 **Gilles Durrieu.** A nonparametric statistical procedure for the detection of marine pollution and global warming effects.
  Here statistical methods are integrated to essential ecological questions

- 11:00-11:30 **William Kengne**. Model selection for common time series models.
  Model selection is a analogous idea tending to decrease the dimensions by using a data based procedure

Western session, September 10

- 15:00-15:45 **Joel E Cohen**. Tornadoes, infectious disease, human death rates, fish, and prime numbers: variance functions and Taylor's law of fluctuation scaling.
  Joel Cohen is the main contributor for Taylor's laws applied to ecological networks.

- 15:45-16:30 **Victor de la Pena**. On the Empirical Taylor's Law and the Bias of the Coefficient of Variations.
  Probabilistic issues to Taylor's law

- 16:30-17:15 **Yahia Sahli**. Dynamic Taylor's laws.
  This is a proposal for a dynamical variant of Taylor's law

- 17:15-18:00 **Joseph Rynkiewicz**. Mixtures of Nonlinear Poisson Autoregressions.
  Many ecological networks discount individuals and the statistics of count time series is thus a main issue

- 9:00-10:00   **Hélène Morlon**. Stochastic models in (macro)evolution.
  Mathematical models for evolution are a main issue of ecology

- 10:00-10:45   **Alejandra Cabana**. Estimation of under reporting in count time series data. Application to CoVID-19 cases.
  The importance dynamical behaviours of epidemics does not need more justifications in this incredible epoch

- 10:45-11:30   **Viet Chi Tran**. User-driven exploration of social networks with application in epidemiology.
  Understand the expansion of epidemics is very natural through graph theoretical arguments

Western session, September 11

This last session will aim at organising the further work in the EcoDep project.

Many statistical and modelling developments are still necessary to make the project efficient. The staff will enlarge soon by hiring co-tutored PhD students as well as Postdoc researchers. Moreover applied internships in a company will rapidly proposed to Master level students as a follow-up of the specific Master level courses initiated at CYU.

The project will also run effective procedures fo analyse data sets which will be rapidly set online.

The Ecodep homepage will be regularly updated.