

Lecturer Opportunity at Ecole Polytechnique, France
In Stochastic Simulation, Uncertainty Quantification, Statistical modeling
Chaire “Stress Testing” (joint program with BNP Paribas)

Location. École Polytechnique is a French public institution of higher education and research in Palaiseau, in the southwest of Paris. It was established in 1794 by the mathematician Gaspard Monge during the French Revolution. It is one of the most prestigious and selective French grandes écoles. Polytechnique has several research laboratories operating in various scientific fields (physics, mathematics, computer science, economics, chemistry, biology, etc.).

Research program. The *Chaire* “Stress Testing” is a specific research program between Ecole Polytechnique and BNP Paribas, and is hosted at Polytechnique by the Center of Applied Mathematics <https://portail.polytechnique.edu/cmmap/en>

This research project is part of an in-depth reflection on the increasingly sophisticated issues surrounding stress tests (under the impulse of the upcoming European Banking regulation). Simulation of extreme adverse scenarios is an important topic to better understand which critical configurations can lead to financial and systemic crises. These scenarios may depend on complex phenomena, for which we partially lack information, making the modeling incomplete and uncertain. Last, the data are multivariate and reflect the dependency between driving variables.

From the above observations, different lines of research are considered:

- 1) the generation of stress test and meta-modeling scenarios using machine learning
- 2) the quantification of uncertainties in risk metrics
- 3) modeling and estimation of multidimensional dependencies

Keywords: Bayesian Networks, copulas, dependent data, Deep Learning, Gaussian processes, machine learning, Markov Chain Monte Carlo, meta-modeling, multivariate statistics, rare event simulation, risk metrics, splitting methods, stochastic algorithms, stochastic and Bayesian optimization, uncertainty propagation

Candidate profile:

- A PhD in Probability and Statistics, or equivalent
- A proven track record in quality research, as evidenced by research publications in the top scientific journals and conferences
- Solid working knowledge of some of the topics listed above (see keywords), both in research and teaching
- Solid working knowledge in the development of numerical methods or data analysis (with Python, R)
- An understanding of financial risks is desirable
- Good communication and management skills, allowing to be involved in the scientific life of the Chaire

Position: 3 years, extension is possible.

The teaching load will be about 70 hours/year.

Net salary: about 2800€/month depending on the experience

How to Apply: Your application should include a Cover Letter, Resume, publications, description of teaching experience. With your application, we ask that you briefly outline your experience against the selection criteria in the position description.

Contact for application: emmanuel.gobet@polytechnique.edu