

CAROLINE COGNOT

PhD Student@EDF&AgroParisTech ♦ Palaiseau, France

Personal website ♦ caroline.cognot@agroparistech.fr

CURRENT POSITION

I am a last year PhD student at **EDF / AgroParisTech** (CIFRE contract), with a defense planned around **15th March 2026**. My supervisors are **Liliane Bel** (Mathématiques et Informatique Appliquées, AgroParisTech-Université Paris-Saclay), **Sylvie Parey** (EDF R&D) and **David Métivier** (Mathematics, Informatics and STatistics for Environment and Agriculture, Montpellier)

My PhD subject is on **stochastic models for multisite, multivariate weather variables** for application in the energy sector. It involves spatial statistics, extremes and hidden Markov processes.

EDUCATION

Generalist engineering diploma, Ecole Centrale de Lyon. 2022

Master of Applied Mathematics, double diploma obtained with University Lyon 1. 2021 - 2022

Deterministic mathematics and statistics : PDE solving, inverse problems, stochastic processes, efficient programming, epidemiology, high dimensional statistics.

1 semester elective courses 2021

Signal processing (filtering, image processing), electronics, and applied mathematics.

3 semester common courses 2019 - 2021

Mathematics, informatics, signal processing, mechanics (solids and continuous).

Bachelor of Mathematics (L3), obtained from Lyon 1 university. Degree obtained in parallel with the 1st year of engineering school. 2019 - 2020

CPGE in Maths, Physics and Computer Science, intensive program with goal on nationwide competitions for school admission, followed cursus : MPSI, MP*, Lycée Henri Poincaré Nancy. 2017 - 2019

Baccalauréat général série S mention Très Bien, speciality Mathematics, option Earth Science and Biology, Lycée Chopin, Nancy. 2017

PUBLICATIONS

Caroline Cognot, Liliane Bel, David Métivier and Sylvie Parey 2025

A Spatio-Temporal Weather Generator for the Temperature over France.

Advances in Statistical Climatology, Meteorology and Oceanography 11, n° 2 (2025): 203-28.

<https://doi.org/10.5194/ascmo-11-203-2025>.

PRESENTATIONS (SELECTED FROM ABSTRACT)

Caroline Cognot, Liliane Bel, David Métivier and Sylvie Parey 2025

Spatio-temporal generation of precipitations using a spatially correlated Bernoulli and hidden Markov model

Journées de Géostatistiques 2025 – Fontainebleau, September 2025

Caroline Cognot, Liliane Bel, David Métivier and Sylvie Parey 2025

Spatio-temporal generation of precipitations using a spatially correlated Bernoulli and hidden Markov model

Spatial Statistics 2025 – Spatial Statistics conference, Noordwijk, July 2025

- Caroline Cognot, Liliane Bel, David Métivier and Sylvie Parey** 2025
Spatio-temporal generation of precipitations using a spatially correlated Bernoulli and hidden Markov model
MaSeMo 2025 – Workshop on Markov, semi-Markov model and associated fields, Paris, June 2025
- Caroline Cognot, Liliane Bel, David Métivier and Sylvie Parey** 2025
Spatio-temporal generation of precipitations using a spatially correlated Bernoulli and hidden Markov model
JdS 2025 – Journées de statistiques de la SFDS, Marseille, June 2025
- Caroline Cognot, Liliane Bel, Sylvie Parey** 2025
Frequency and spatial extend of heat and cold waves in France and climate change
ICEM 2025 – International Conference on Electricity and Meteorology, Padova, June 2025
- Caroline Cognot, Liliane Bel, David Métivier and Sylvie Parey** 2024
Spatio-temporal weather generator for the temperature over France
JdS 2024 – Journées de statistiques de la SFDS, Bordeaux, May 2024
- Caroline Cognot, Liliane Bel, David Métivier and Sylvie Parey** 2024
Spatio-temporal weather generator for the temperature over France
IMSC 2024 – International Meeting on Statistical Climatology, Toulouse, June 2024

TALKS

- Caroline Cognot, Liliane Bel, David Métivier and Sylvie Parey** 2025
Stochastic Weather Generators for spatial-temporal generation of temperature and rain over France
Rencontres Statistiques Lyonnaises 2025, Lyon, France, September 2025
- Caroline Cognot, Liliane Bel, David Métivier and Sylvie Parey** 2025
Spatio-temporal generation of precipitations using a spatially correlated Bernoulli and hidden Markov model
Lab seminar, MIA Paris-Saclay 2025, Palaiseau, France, June 2025
- Caroline Cognot, Liliane Bel, David Métivier and Sylvie Parey** 2024
Générateur spatio-temporel de température en France
Statistiques au sommet de Rochebrune 2024, Rochebrune, France, March 2024
- Les rencontres MathTech 2024** 2024
 5 min presentation of my PhD subject at an event organised by Fondation Mathématiques Jacques Hadamard (FMJH) at the Institut des Hautes Etudes Scientifiques (IHES), January 2024

RESEARCH EXPERIENCE

- Internship in stochastic modelling of weather variables (Paris Saclay, France)** 2022
Duration and location: 5 months in the R38 team (Météo, Climat et prévisions EnR) at EDF lab Paris-Saclay
Supervisor(s): Sylvie Parey and Thi-Thu-Huong Hoang

Subject: Comparison of two stochastic models for the study of extremes in the context of climate change.

Programming Languages: R .

Results: I have compared a SFHAR model(Seasonal Functional Heteroscedastic Auto-Regressive) and a NHHM model(Non Homogenous Hidden Markov Model). I proposed post-treatment approaches to combine temperature simulations from the first model and wind/precipitations from the second model,.

Internship in automatics at Lund University (Lund, Sweden)

2021

Duration and location: 3 months in the Automatics laboratory

Supervisor(s): Pauline Kergus

Subject: Data-driven building modelling.

Programming Languages: Matlab.

Results: I have proposed a model to predict the temperature inside a residential building from outside temperature and heating power. I also worked on a model for the energy demand of the building.

ENGAGEMENT, TEACHING AND DISSEMINATION

Teaching activities

- **Lab instructor** in **Spatial statistics** 2024-2026
- **TD instructor** in **Mathematic modeling and its applications - statistics** 2023-2025
1st year agronomy engineering students, AgroParisTech
- **R lab assistant instructor** in **Data science - statistical learning** 2023-2025
2nd year agronomy engineering students, AgroParisTech.
- **Tutor** in **general mathematics** 2020-2021
1st year engineering students, Ecole Centrale de Lyon.

Secondaire School tutoring, Toujours Ensemble, Montréal, Canada

2022

Subject: All subjects in "secondaire" school, focus on science

Function: Tutor

Audience: Secondaire students aged 12 to 15

Student project, Ecole Centrale de Lyon

2019 - 2020

Subject: Biofuel microbial cell with the help of a plant

Results: Study of the bibliography about biofuel microbial cells. Organisation of daily measurements, teamwork and popularization of science. Conception of a demonstrator to be exposed in the entrance of the Ampère laboratory.

LANGUAGES

French Native

English TOEFL English C1 Certification, 2021

German B2

Spanish A1

Computer languages Python, R, Matlab, Julia, LaTeX