

# CAROLINE COGNOT

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## CURRENT POSITION

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I am a second year PhD student at **EDF / AgroParisTech** (CIFRE contract). 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

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**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

## PRESENTATIONS (SELECTED FROM ABSTRACT)

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**Caroline Cognot, Liliane Bel, Sylvie Parey and David Métivier** 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, Sylvie Parey and David Métivier** 2024  
**Spatio-temporal weather generator for the temperature over France**  
**IMSC 2024** – International Meeting on Statistical Climatology, Toulouse, June 2024

## TALKS

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

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**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

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### Teaching activities

- **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

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**French** Native

**English** TOEFL English C1 Certification, 2021

**German** B2

**Spanish** A1