

# Océane Cassan

Currently searching for a postdoctoral position



## EDUCATION

- 2022 (defense in december) | 2019 • **University of Montpellier**  
PhD in biostatistics for gene regulation Montpellier, France
- 2019 | 2018 • **University Claude Bernard (UCBL)**  
MSc in Computer Science - Artificial Intelligence Lyon, France
- 2019 | 2014 • **National Institute of Applied Sciences (INSA)**  
Engineering degree in Bioinformatics and Modelling Lyon, France



## RESEARCH EXPERIENCE

- 2022 | 2019 • **PhD - Institute for Plant Sciences in Montpellier**  
Predictive biology to learn the regulatory pathways in plants under climate change, **SIRENE** team Montpellier, France
  - Statistical inference of the gene regulatory networks in *Arabidopsis thaliana* under elevated CO<sub>2</sub> and nutritional limitations. Development of novel network reconstruction methods via ensembles of regression trees or penalized linear regression based on transcriptomic data and regulatory sequences information. **Computational and experimental validation** of network-derived hypotheses and candidate genes.
  - **Genome Wide Association studies** to identify genetic determinants of mineral status response under elevated CO<sub>2</sub>
  - **Development of an interactive suite** for reproducible transcriptomic analyses and the inference of regulatory networks
  - Supervisors : Antoine Martin, Sophie Lèbre
- 2019 • **6 months research internship - LIRMM, MAB team**  
Supervised learning to predict chromosomic interactions in the human genome, based on CAGE data and 3C techniques Montpellier, France
  - Supervisor : Laurent Bréhélin
- 2017 • **1 month research internship - LIRMM, MAB team**  
Sparse logistic regression to model transcription factor combinatorics for gene regulation in human Montpellier, France
  - Supervisor : Laurent Bréhélin



## PROFESSIONAL EXPERIENCE

- 2018 • **4 months internship in quantitative biology - Nanolive SA**  
Development of software tools for the 3D detection and tracking of biological objects in label free images Lausanne, Switzerland



## CONTACT

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 [github.com/OceaneCsn](https://github.com/OceaneCsn)  
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## SKILLS




**Pluridisciplinarity** : ability to understand and articulate biology, statistics and computer science to generate knowledge

**Statistics** : statistical learning, machine learning, (sparse) regression and feature selection, mixed models, tree-based methods

**Computer science** : R (ggplot, tidyverse, package development, Rmarkdown, Shiny) Python, LaTeX-beamer, Bash, calculation server administration and usage, web application deployment

**Biology** : gene regulation, systems biology, omics data analysis, plant response to the environment, plant nutrition


## TEACHING EXPERIENCE

- 2022  
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2021
  - **Instructor of R for 3<sup>rd</sup> year bachelor plant biology students**  
[Teaching material](#)  University of Montpellier, France
    - Good practices and scientific integrity around data analysis
    - Data manipulation and visualisation in R
- 2022  
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2020
  - **Instructor of Rmarkdown for Master data science students**  
[Teaching material](#)  University Paul Valéry of Montpellier, France
- 2022
  - **Statistics and regression for network inference for Master plant biology students**  
[Lecture](#) and [practical session](#)  University of Montpellier, France
- 2021  
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2022
  - **Student supervision**
    - Master intern in biostatistics applied to gene regulation and transcriptomics
    - Master data science students for an annual project on Genome-Wide-Association studies

## PUBLICATIONS

- 2022 (In preparation)
  - **A gene regulatory network reveals the effects of elevated CO<sub>2</sub> on nutrient signaling pathways and mineral composition in Arabidopsis**  
[Océane Cassan](#), Léa-Lou Pimparé, Antoine Beckers, Alain Gojon, Liên Bach, Christian Dubos, Sophie Lèbre, Antoine Martin. 2022
- 2022 (Submitted)
  - **The decline of plant mineral nutrition under rising CO<sub>2</sub>: physiological and molecular aspects of a bad deal**  
Alain Gojon, [Océane Cassan](#), Liên Bach, Laurence Lejay, Antoine Martin. 2022 Review article, Trends in Plant Science.
- 2022
  - **Loss of Polycomb proteins CLF and LHP1 leads to excessive RNA degradation in Arabidopsis**  
David Séré, [Océane Cassan](#), Fanny Bellegarde, Cécile Fizames, Jossia Boucherez, Geoffrey Schivre, Jacinthe Azevedo, Thierry Lagrange, Alain Gojon, Antoine Martin. 2022 Journal of Experimental Botany. [See article](#)
- 2021
  - **Inferring and Analyzing Gene Regulatory Networks from Multi-Factorial Expression Data: A Complete and Interactive Suite**  
[Océane Cassan](#), Sophie Lèbre, and Antoine Martin. 2021 BMC Genomics 22 (1). [See article](#)
- 2019
  - **Probing Transcription Factor Combinatorics in Different Promoter Classes and in Enhancers**  
Vandel Jimmy, [Océane Cassan](#), Sophie Lèbre, Charles-Henri Lecellier, and Laurent Bréhélin. 2019 BMC Genomics 20 (1): 1–19. [See article](#)

## TALKS

- 2022
  - **Machine Learning in Montpellier, Theory & Practice**  
Speaker  University of Montpellier
    - Discussing : Reconciling modern machine-learning practice and the classical bias-variance trade-off, Belkin et al, 2019.

- 2020 • **Netbio, biological networks inference**  
Speaker 📍 Virtual  
• Presenting the Dashboard for the Inference and Analysis of Networks from Expression data

## CONFERENCE POSTERS

- 2022 • **Molecular responses of plants facing climate change**  
**Organizer and presenter** 📍 Montpellier, France  
• Poster presenting genetic determinants to mineral status response under elevated CO<sub>2</sub> in Arabidopsis populations
- 2021 • **JOBIM**  
Presenter 📍 Virtual  
• Poster presenting the Dashboard for the Inference and Analysis of Networks from Expression data
- 2021 • **International Plant Systems Biology**  
Presenter 📍 Virtual  
• Poster presenting Gene Regulatory Network inference of Arabidopsis under elevated CO<sub>2</sub> and nutritional limitations



## ACADEMIC REFEREES

Antoine Martin, senior researcher in plant biology, head of SIRENE team, IPSiM,  
CNRS : [antoine.martin@cnrs.fr](mailto:antoine.martin@cnrs.fr)

Sophie Lèbre, lecturer and researcher in statistics, IMAG, University of Montpellier,  
University Paul Valéry : [sophie.lebre@umontpellier.fr](mailto:sophie.lebre@umontpellier.fr)

Laurent Bréhélin, senior researcher in computational biology, head of MAB team,  
LIRMM : [brehelin@lirmm.fr](mailto:brehelin@lirmm.fr)