OCÉANE CASSAN

Postdoctoral researcher in statistical learning for gene regulation

🎓 EDUCATION

📧 oceane.cassan@lirmm.fr

2022 | 2019	**University of Montpellier** PhD in Systems Biology	📍 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

2023

Postdoc - Laboratory of Computer Science, Robotics and Microelectronics of Montpellier (LIRMM)
Statistical learning for the prediciton of R-loops formation (DNA-RNA hybrids with roles in gene regulation and genomic instability). Several DNA sequence features are investigated to classify transcription initialition sites forming R-loops based on R-Chip data.

📍 Montpellier, France

- Team : Joint IGMM/LIRMM/IMAG Computational Regulatory Genomics
- Collaborators : Rosemary Kiernan (IGH) and Jérôme Moreaux (CHU).

2022 \| 2019

PhD - Institute for Plant Sciences in Montpellier (IPSIM)
Systems biology to learn the regulatory pathways in plants under climate change,

📍 Montpellier, France

- **Statistical inference of the gene regulatory networks in** *Arabidopsis thaliana* **under elevated CO_2 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 repsonse under elevated CO_2
- **Development of an** interactive suite for reproducible transcriptomic analyses and the inference of regulatory networks
- Supervisors : Antoine Martin, Sophie Lèbre
- Team : SIRENE

CONTACT

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🐙 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 developement, 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

2019 ● **6 months research internship - Laboratory of Computer Science, Robotics and Microelectronics of Montpellier (LIRMM)**
Supervised statistical learning to predict chromosomic interactions in the human genome, based on CAGE data and chromatin contact data.

 Montpellier, France

• Supervisor : Laurent Bréhélin
• Team : Joint IGMM/LIRMM/IMAG Computational Regulatory Genomics

2017 ● **1 month research internship - Laboratory of Computer Science, Robotics and Microelectronics of Montpellier (LIRMM)**
Sparse logistic regression to model transcription factor combinatorics for gene regulation in human

 Montpellier, France

• Supervisor : Laurent Bréhélin
• Team : Joint IGMM/LIRMM/IMAG Computational Regulatory Genomics

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

TEACHING EXPERIENCE

2022
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2021 ● **Instructor of R for 3rd 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 Valery 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 2 intern in biostatistics appied to gene regulation and transcriptomics
• Master 1 data science students for an annual project on Genome-Wide-Association studies

PUBLICATIONS

2023 ● **A gene regulatory network reveals the effects of elevated CO_2 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
See article

2022 • **The decline of plant mineral nutrition under rising CO_2: physiological and molecular aspects of a bad deal**
Alain Gojon, <u>Océane Cassan</u>, Liên Bach, Laurence Lejay, Antoine Martin. 2022 Review article, Trends in Plant Science. See article

2022 • **Loss of Polycomb proteins CLF and LHP1 leads to excessive RNA degradation in Arabidopsis**
David Séré, <u>Océane Cassan</u>, 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**
<u>Océane Cassan</u>, 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, <u>Océane Cassan</u>, 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_2 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_2 and nutritional limitations

🔖 ACADEMIC REFEREES

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

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

Laurent Bréhélin, senior researcher in computational biology, head of MAB team, LIRMM : brehelin@lirmm.fr