

Dr. Christophe BOTELLA

Nationality : French
Born on 18/01/1991 in Auch
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Education

2009-2010

Lycée Pierre de Fermat, 1st year of preparatory school, MPSI (Maths-Physics)

2010-2012

LEGTA Auzeville, 1st and 2nd years of preparatory school BCPST (Biology-Chemistry and Maths). A-Bio 2012 ranking: 360th over 2915 candidates.

2012-2016

AgroParisTech, Paris Institute of Technology for Life, Food and Environmental Sciences.

1st and 2nd years, specialty: Sustainable agriculture and territories

Gap year: International Experience Certificate (CEI)

3rd year: **M2 Mathematics for Life Sciences (University Paris-Sud)**

Professional experiences

April 2013

Agriculture internship, EARL La Ferme en Coton, Auch, France. Mixed crops and chickens breeding in an organic farm (1 month). Supervised by Nicolas Petit.

Juin – Juillet 2014

Engineer Internship, Association Terr'Avenir Nord-Pas-de-Calais, Lilles, France. gathering of agro-environmental practices and identification of common indicators in a network of farmers certified ISO 14001 (2 months). Supervised by Therese-Marie Couvreur.

September 2014 – February 2015

Agronomic research internship, Plant Research Ltd (NZ), Lincoln, New Zealand. Identification of screening tools for the breeding of cover-crop radish - *Raphanus sativus* (6 months). Supervised by Adrian Russell.

Mars 2015 – Août 2015

Biostatistics research internship, Limagrain Europe, Chappes, France. Optimization of trial designs using relatedness information (6 months). Supervised by Nicolas Heslot.

April 2016 – September 2016

Biostatistics research internship, Laboratory of Probability, Statistics and Modeling, University Pierre et Marie Curie, Paris, France. Functional regression based on gaussian processes for longitudinal medical data (6 months). Supervised by Agathe Guilloux (MC-UPMC) and Anne-Sophie Jannot (MCU-PH).

October 2016 – September 2019

PhD candidate INRA, at UMR AMAP, Montpellier.

Statistical methods for plant species distribution modeling based on massive occurrences from citizen sciences programs.

Supervision : Alexis JOLY (CR INRIA Zénith), Pascal MONESTIEZ (DR, INRA BioSP), François MUNOZ (Pr U. Grenoble).

Funded by the INRA - INRIA national scholarship 2016.

PhD Defense on 08/10/2019 for the grade of Doctor in Biostatistics. Jury: Joseph Salmon (Presider), Antoine Guisan (Reviewer), Illian Janine (Reviewer), Chadoeuf Joël (Examiner), Alexis Joly (Director), Pascal Monestiez (Co-director), François Munoz (Co-director), Pierre Bonnet (Guest).

December 2019 – June 2021

PostDoc CNRS at Laboratoire d'Écologie Alpine (LECA).

Comparison of trophic interaction network architectures using graphs embedding methods.

Supervision: Vincent Miele (CNRS, LBBE), Wilfried Thuiller (CNRS, LECA), Stéphane Dray (CNRS, LBBE), Catherine Mathias (CNRS, LSPM). Funded by ANR project [EcoNet](#).

August 2021 – Present

PostDoc Fellow at Center for Invasion Biology (C.I.B.), Stellenbosch University, South Africa. *Assessing the current and potential value of iNaturalist data for invasion science in South Africa.* Supervision: Prof. David M. Richardson (C.I.B., Stellenbosch University) and Prof. Cang Hui (BioMath, C.I.B., Stellenbosch University).

Publications

Articles

- Botella, C., Joly, A., Bonnet, P., Monestiez, P., & Munoz, F. (2018). Species distribution modeling based on the automated identification of citizen observations. *Applications in Plant Sciences*, 6(2), e1029. <https://doi.org/10.1002/aps3.1029>
- Botella, C., Joly, A., Monestiez, P., Bonnet, P., & Munoz, F. (2020) Bias in presence-only niche models related to sampling effort and species niches: lessons for background points selection. *PLOS One*, 15(5), e0232078. <https://doi.org/10.1371/journal.pone.0232078>
- Botella, C., Joly, A., Bonnet, P., Munoz, F., & Monestiez, P. (2021). Jointly estimating ecological niches and spatial sampling effort from multiple species occurrences. *Methods in Ecology and Evolution*, 12(5), 933-945. <https://doi.org/10.1111/2041-210X.13565>
- Deneu, B., Servajean, M., Bonnet, P., Botella, C., Munoz, F., & Joly, A. (2021) Convolutional neural networks improve species distribution modelling by capturing the spatial structure of the environment. *PLoS computational biology*. <https://doi.org/10.1371/journal.pcbi.1008856>
- Botella, C., Dray, S., Matias, C., Miele, V., & Thuiller, W. (2021). An appraisal of graph embeddings for comparing trophic network architectures. *Methods in Ecology and Evolution*, 13(1), 203-216. <https://doi.org/10.1111/2041-210X.13738>
- Gaüzère, P., O'Connor, L., Botella, C., Poggiato, G., Münkemüller, T., Pollock, L. J., ... & Thuiller, W. (2022). The diversity of biotic interactions complements functional and

phylogenetic facets of biodiversity. *Current Biology*, 32(9), 2093-2100. <https://doi.org/10.1016/j.cub.2022.03.009>

- Botella, C., Bonnet, P., Hui, C., Joly, A., & Richardson, D. M. (2022). Dynamic Species Distribution Modeling Reveals the Pivotal Role of Human-Mediated Long-Distance Dispersal in Plant Invasion. *Biology*, 11(9), 1293. <https://doi.org/10.3390/biology11091293>
- De Beer, I., Hui, C., Botella, C. & Richardson, D.M. (2023). Drivers of community turnover of naturalized woody trees and shrubs at different range sizes. *Frontiers in Ecology And Evolution* (Under review).
- Botella, C., Gaüzère, P., O'Connor, L., Ohlmann, M., Renaud, J., Dou, Y., Graham, C., Verburg, P., Maiorano & L., Thuiller, W. (2023). Land-use intensity influences European tetrapod food-webs. *Ecology Letters* (Under review).

Book chapters

- Botella, C., Joly, A., Bonnet, P., Monestiez, P., & Munoz, F. (2018). A Deep Learning Approach to Species Distribution Modelling. In *Multimedia Tools and Applications for Environmental & Biodiversity Informatics* (pp. 169-199). Springer, Cham. https://doi.org/10.1007/978-3-319-76445-0_10
- Joly, A., Goëau, H., Botella, C., Glotin, H., Bonnet, P., Vellinga, W. P., ... & Müller, H. (2018). Overview of LifeCLEF 2018: A Large-Scale Evaluation of Species Identification and Recommendation Algorithms in the Era of AI: 9th International Conference of the CLEF Association, CLEF 2018, Avignon, France, September 10-14, 2018, Proceedings. [Link](#).
- Joly, A., Goëau, H., Botella, C., Kahl, S., Servajean, M., Glotin, H., ... & Müller, H. (2019, September). Overview of lifeclef 2019: Identification of amazonian plants, south & north american birds, and niche prediction. In *International Conference of the Cross-Language Evaluation Forum for European Languages* (pp. 387-401). Springer, Cham.
- Deneu, B., Servajean, M., Botella, C., & Joly, A. (2019). Evaluation of deep species distribution models using environment and co-occurrences. In *International Conference of the Cross-Language Evaluation Forum for European Languages* (pp. 213-225). Springer, Cham. [Download preprint =D](#).
- Joly, A., Goëau, H., Kahl, S., Deneu, B., Servajean, M., Cole, E., ... & Müller, H. (2020). Overview of LifeCLEF 2020: a system-oriented evaluation of automated species identification and species distribution Prediction. In *International Conference of the Cross-Language Evaluation Forum for European Languages* (pp. 342-363). Springer, Cham.
- Botella, C., Marchante, H., Celesti-Gradow, L., Brundu, G., Geerts, S., Ramirez-Albores, J., González-Moreno, P., Ritter, M. & Richardson, D.M. (2023) The global distribution of Australian *Acacia* species. In *Wattles – Australian Acacia species around the world* (Under review). CABI.

Conference papers

- Joly A. et al. (2019) LifeCLEF 2019: Biodiversity Identification and Prediction Challenges. In: Azzopardi L., Stein B., Fuhr N., Mayr P., Hauff C., Hiemstra D. (eds)

Advances in Information Retrieval. ECIR 2019. Lecture Notes in Computer Science, vol 11438. Springer, Cham. [Link](#). ([Download preprint =D](#))

Working notes

- Botella, C., Bonnet, P., Munoz, F., Monestiez, P., & Joly, A. (2018). Overview of GeoLifeCLEF 2018: location-based species recommendation. In CLEF 2018. [Download pdf](#).
- Deneu, B., Servajean, M., Botella, C., & Joly, A. (2018). Location-based species recommendation using co-occurrences and environment-GeoLifeCLEF 2018 challenge. In CLEF 2018. [Download pdf](#).
- Botella, C., Servajean, M., Bonnet, P., & Joly, A. (2019). Overview GeoLifeCLEF 2019: plant species prediction using environment and animal occurrences. In *Working Notes of CLEF 2019-Conference and Labs of the Evaluation Forum* (No. 2380). [Download pdf](#).
- Deneu, B., Lorieul, T., Cole, E., Servajean, M., Botella, C., Bonnet, P., & Joly, A. (2020, September). Overview of LifeCLEF location-based species prediction task 2020 (GeoLifeCLEF). In *CLEF 2020*.

Data papers

- Cole, E., Deneu, B., Lorieul, T., Servajean, M., Botella, C., Morris, D., ... & Joly, A. (2020). The GeoLifeCLEF 2020 Dataset. *arXiv preprint arXiv:2004.04192*. [Download pdf](#).

International conferences

24 to 26 august 2017

Invited speaker at [Conference of The International Environmetrics Society \(TIES\)-GRASPA 2017](#) in Bergamo, Italy.

2 to 6 august 2018

Speaker at the [International Statistical Ecology Conference \(ISEC\) 2018](#), in St Andrews, Scotland.

10 to 14 september 2018

Speaker at the [Conference and Labs of the Evaluation Forum \(CLEF\) 2018](#) in Avignon, France.

10 to 16 august 2019

Speaker at the [Ecological Society of America conference 2019](#) in Louisville, Kentucky, United States of America.

9 to 12 september 2019

Speaker at the [Conference and Labs of the Evaluation Forum \(CLEF\) 2019](#) in Lugano, Switzerland.

22 to 26 june 2020

Speaker at the [International Statistical Ecology Conference \(ISEC\) 2020](#), in Sydney, Australia.

Other interventions and actions

- Invited seminary speaker at « **les jeudis de l'AMAP** » at UMR AMAP, Montpellier, the 20/04/2017.
- Invited seminary speaker at **Laboratoire d'écologie Alpine**, University of Grenoble, the 16/06/2017.
- Speaker at the **colloque INRA MIA**, in Toulouse, the 27/06/2017.
- Speaker at the **meetings of CisStats network 2017** in Lyon from 4 to 5/10/2017.

- Participated to the **workshop of project Data Analysis by Citizens** from GDR PARCS, in Montpellier on the 03/11/2017.
- Organiser of the [GeoLifeCLEF 2018 challenge](#), terminated on the 8 may 2018. A task of the LifeCLEF evaluation campaign 2018.
- Speaker at the meetings of [GDR Ecologie Statistique 2018](#) in Grenoble from 4 to 5/10/2018.
- Invited speaker at the day [Environment and images](#), at Institute Henri Poincaré in Paris on the 15/02/19.
- Invited seminary speaker at [Ecological & Centre for Research into Ecological & Environmental Modelling \(CREEM\)](#), St Andrews, Scotland, on 18/04/19.
- Organiser of the [GeoLifeCLEF 2019 challenge](#), terminated on the 6 may 2019. A task of the LifeCLEF evaluation campaign 2019.
- Speaker at the **meetings of CisStats network 2019** in Avignon on the 15/05/2019.
- Organizer of a workshop **practical introduction to deep learning with R-mxnet**, in UMR AMAP, Montpellier on the 03/09/2019.
- Invited seminary speaker at the lab **INRAE MIA**, Toulouse, on the 16/10/2020.
- Participated to the workshop [INRAE CisStats 2021](#), 2th - 4th June 2021 in the Champsaur, France.
- Organiser of a workshop on **iNaturalist uses for Invasion Science** in Stellenbosch University on the 15th september 2021.
- Organiser of a workshop on **Dynamic species distribution models and the predictability of biological invasion** in Stellenbosch University on the 18th May 2022.
- Invited webinar speaker for the IMOTEP-INRAE group about **Methodological questions around citizen science data for biodiversity studies** on the 2nd December 2022.

Fundings and scholarships

- **National doctoral scholarship** from INRA-MIA and INRIA on 07/16 (3 years salary).
- **Individual mobility scholarship** from GDR Ecologie Statistique on 03/2017, for a collaboration with Wilfried Thuiller at LECA, Grenoble, France (2 weeks and travel).
- **Individual mobility scholarship** from the GDR Ecologie Statistique on 10/2018, for a collaboration with François Munoz at LECA, Grenoble France (2 weeks and travel).
- **Individual international mobility funding of the Explore #2 program** from Montpellier UniverSity of Excellence (MUSE) on 02/2019, for a collaboration with Janine Illian at CREEM, St Andrews, UK (1 week and travel).

Skills

English (C1) fluent

Informatic: R (expert), LaTeX, Python, HTML, Matlab, Excel, Word, Powerpoint, ArcGis

Interests, others

Member of the Bureau des Etudiants (BDE) of AgroParisTech 2012-2013 : External relations

Association "Les débats de l'Agro" in AgroParisTech 2013-2014: Secretary

Forestry: Management of small scale forests since 2016

French boxing: Ranked 2nd at national universities championships edition 2017-2018, team leader for edition 2018-2019

Surf, Photography

Driving license