Dr. Christophe BOTELLA

Nationality : French
Born on 18/01/1991 in Auch
Adresse: Bureau 02.249, Bâtiment 5,
Inria, Université Montpellier,
860 rue St Priest,
34095 Montpellier cedex 5
Ph. : +33 (0)6 709 709 81
Mail : **christophe.botella@inria.fr**

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).

2012-2016: **AgroParisTech**, Paris Institute of Technology for Life, Food and Environmental Sciences. With International Experience Certificate (CEI) during a Gap year (2014-2015).

3rd year: **M2 Mathematics for Life Sciences (University Paris-Sud / 11)**

Professional experiences

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'Ecologie 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 – January 2023: **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).

February 2023 – September 2023: **PostDoc INRIA** for the MAMBO Horizon EU project, in the Pl@ntNet group, LIRMM, Montpellier, France. Supervisor: Alexis Joly (Inria).

October 2023 – Present: **Permanent research scientist (Chargé de recherche /ISFP), INRIA**, Zenith team, part of UMR LIRMM, University of Montpellier.

Publications

Published 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*.
- 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 compositional turnover of narrow-ranged versus widespread naturalised woody plants in South Africa. *Frontiers in Ecology And Evolution, 11, 103.* https://doi.org/10.3389/fevo.2023.1106197
- Van der Colff, D., Kumschick, S., Foden, W., Raimondo, D., Botella, C., von Staden, L., & Wilson, J. R. U. (2023). Drivers, predictors, and probabilities of plant extinctions in South Africa. *Biodiversity and Conservation*, *32*(13), 4313-4336. https://doi.org/10.1007/s10531-023-02696-7
- ter Huurne, M. B., Potgieter, L. J., Botella, C., & Richardson, D. M. (2023). Melaleuca (Myrtaceae): Biogeography of an important genus of trees and shrubs in a changing world. *South African Journal of Botany*, *162*, 230-244. https://doi.org/10.1016/j.sajb.2023.08.052
- Gaüzère, P., Botella, C., Poggiato, G., O'Connor, L., Di Marco, M., Dragonetti, C., ... & Thuiller, W. (2023). Dissimilarity of vertebrate trophic interactions reveals spatial uniqueness but functional redundancy across Europe. *Current Biology*, *33*(23), 5263-5271. https://doi.org/10.1016/j.cub.2023.10.069
- Botella, C., Gaüzère, P., O'Connor, L., Ohlmann, M., Renaud, J., Dou, Y., ... & Thuiller, W. (2024). Land-use intensity influences European tetrapod food webs. *Global change biology*, *30*(2), e17167. https://doi.org/10.1111/gcb.17167

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.

- Richardson, D. M., Binggeli, P., & Botella, C. (2023). Australian Acacia Species in Africa. *Wattles: Australian Acacia Species Around the World*, 181-200. https://doi.org/10.1079/9781800622197.0012

- Botella, C., Marchante, H., Celesti-Grapow, L., Brundu, G., Geerts, S., Ramirez-Albores, J., Gonzalez-Moreno, P., Ritter, M. & Richardson, D.M. (2023) The global distribution of *Acacia*. In Wattles: Australian *Acacia* species around the world. CABI. https://doi.org/10.1079/9781800622197.000

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)

- Picek, L., Botella, C., Servajean, M., Leblanc, C., Palard, R., Larcher, T., ... & Joly, A. (2024). *GeoPlant: Spatial Plant Species Prediction Dataset.* In *NeurIPS 2024* (Under review) (preprint)

Scientific outreach articles

- Castagneyrol, B., Botella, C. & Fontaine, B. (2022). Sciences citoyennes et qualité des données sur la biodiversité: Un faux problème? Numéro spécial n°1, art. 6. *Novae*, INRAE. https://doi.org/10.17180/novae-2022-ns01-art06

- Streito, J. C., Papaix, J., Chartois, M., Botella, C., Pierre, É., Armand, J. M., ... & Rossi, J. P. (2023). Les citoyens, sentinelles de la surveillance phytosanitaire?. In Crises sanitaires en agriculture: Les espèces invasives sous surveillance (pp. 151-166). Quae. https://www.quae.com/produit/1749/9782759234837/crises-sanitaires-en-agriculture

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*.

Preprints (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.

- Botella, C., Deneu, B., Marcos, D., Servajean, M., Estopinan, J., Larcher, T., … & Joly, A. (2023). The GeoLifeCLEF 2023 dataset to evaluate plant species distribution models at high spatial resolution across Europe. *arXiv preprint arXiv:2308.05121*.

Revisions for scientific journals

Biodiversity and Conservation (02/2021), Oikos (05/2021), Computo (10/2021), Neobiota (03/2022), Biological Invasions (05/2022), Science of the Total Environment (08/2022), Bulletin of Mathematical Biology (09/2022), Frontiers in Ecology and Evolution (01/2023), Nature Communications (06-10/2023), Biological Conservation (06/2023), Ecological Informatics (09/2023), Methods in Ecology and Evolution (06/2024)

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.

27 june to 1ˢᵗ july 2022: Speaker at the **International Statistical Ecology Conference (ISEC) 2022,** in Cape Town, South Africa.

17 to 23 April 2023: Speaker at **EURING 2023 Analytical Meeting & Workshop,** in Montpellier, France.

8 to 11 january 2024: Poster presenter at **International Biogeography Society (IBS) 2024**, in Pragues, Czechia.

16 to 21 june 2024: Invited speaker at **World Biodiversity Forum (WBF) 2024**, in Davos, Switzerland.

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 Poincarré 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.

- Co-organiser of a workshop on **Bayesian modeling for ecology with INLA and inlabru** in Avignon with the Cisstats network, France, on the 13-14th April 2023.

- Invited participant to a workshop on the **Bio-economical modeling of invasions** (SPABIO project), in Montpellier, on 30-31th May 2024.

Early career 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, **Spanish** (B1) Independent user

Informatic: R, LateX, Python, HTML, 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, basketball, road Biking

Driving license