


LmB, Université de Franche-Comté  
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Since September 2020, I am *maître de conférences* (lecturer) in the Probability and Statistics team in LmB, in Université de Franche-Comté at Besançon.

**Main research interests** : random trees, stochastic processes that generate them and applications to evolutionary biology.

## Education

- 2019 **PhD in Mathematics. Thesis: “Random structured phylogenies”**.  
Advisor: Amaury Lambert. *Sorbonne Université (ex UPMC, Paris 6)*.
- 2016 **Master 2 (MS) in Mathematics**. Specialty: Probability, Stochastic Processes.  
*UPMC Univ. Paris 6*.
- 2014 **Licence (BS) in Mathematics**. *UPMC Univ. Paris 6*
- 2013 **Admission into École Normale Supérieure, Paris**, in the Mathematics Department.

## Publications

- [1] F. BIENVENU and J.-J. DUCHAMPS. A Branching Process with Coalescence to Model Random Phylogenetic Networks. *Electronic Journal of Probability*, 29 (2024), pp. 1–48. doi: [10.1214/24-EJP1088](https://doi.org/10.1214/24-EJP1088)
- [2] C. DOMBRY and J.-J. DUCHAMPS. Infinitesimal Gradient Boosting. *Stochastic Process. Appl.*, 170 (2024). doi: [10.1016/j.spa.2024.104310](https://doi.org/10.1016/j.spa.2024.104310)
- [3] J.-J. DUCHAMPS, F. FOUTEL-RODIER, and E. SCHERTZER. General Epidemiological Models: Law of Large Numbers and Contact Tracing. *Electron. J. Probab.*, 28 (2023). doi: [10.1214/23-EJP992](https://doi.org/10.1214/23-EJP992)
- [4] F. FOUTEL-RODIER, F. BLANQUART, P. COURAU, P. CZUPPON, J.-J. DUCHAMPS, J. GAMBLIN, É. KERDONCUFF, R. KULATHINAL, L. RÉGNIER, L. VUDUC, A. LAMBERT, and E. SCHERTZER. From Individual-Based Epidemic Models to McKendrick-von Foerster PDEs: A Guide to Modeling and Inferring COVID-19 Dynamics. *J. Math. Biol.*, 85.4 (2022), p. 43. doi: [10.1007/s00285-022-01794-4](https://doi.org/10.1007/s00285-022-01794-4)
- [5] J.-J. DUCHAMPS. Fragmentations with Self-Similar Branching Speeds. *Adv. in Appl. Probab.*, 53.4 (2021), pp. 1149–1189. doi: [10.1017/apr.2021.11](https://doi.org/10.1017/apr.2021.11)
- [6] F. BIENVENU, J.-J. DUCHAMPS, and F. FOUTEL-RODIER. The Moran Forest. *Random Structures & Algorithms*, (2021). doi: [10.1002/rsa.20997](https://doi.org/10.1002/rsa.20997)
- [7] J.-J. DUCHAMPS. Trees within Trees II: Nested Fragmentations. *Ann. Inst. H. Poincaré Probab. Statist.*, 56.2 (2020), pp. 1203–1229. doi: [10.1214/19-AIHP999](https://doi.org/10.1214/19-AIHP999)
- [8] A. BLANCAS, J.-J. DUCHAMPS, A. LAMBERT, and A. SIRI-JÉGOUSSE. Trees within Trees: Simple Nested Coalescents. *Electron. J. Probab.*, 23.0 (2018). doi: [10.1214/18-EJP219](https://doi.org/10.1214/18-EJP219)
- [9] J.-J. DUCHAMPS and A. LAMBERT. Mutations on a Random Binary Tree with Measured Boundary. *Ann. Appl. Probab.*, 28.4 (2018), pp. 2141–2187. doi: [10.1214/17-AAP1353](https://doi.org/10.1214/17-AAP1353)
- [10] J.-J. DUCHAMPS, J. PITMAN, and W. TANG. Renewal Sequences and Record Chains Related to Multiple Zeta Sums. *Trans. Amer. Math. Soc.*, (2018). doi: [10.1090/tran/7516](https://doi.org/10.1090/tran/7516)

## Preprints

- [11] É. COUVERT, F. BIENVENU, J.-J. DUCHAMPS, A. ERARD, V. M. PINA, E. SCHERTZER, and A. LAMBERT. Opening the Species Box: What Microscopic Models of Neutral Speciation Have to Say about Macroevolution (2023). bioRxiv: [2023.11.09.564915](https://doi.org/10.1101/2023.11.09.564915)
- [12] C. DOMBRY and J.-J. DUCHAMPS. A Large-Sample Theory for Infinitesimal Gradient Boosting (2022). arXiv: [2210.00736](https://arxiv.org/abs/2210.00736)

## Mémoires (in French)

- Introduction au domaine de recherche (2016). [Processus de fragmentation, arbres branchants Markoviens](#).
- Mémoire de M2, sous la direction d'Amaury Lambert (2016). [Mutations sur un arbre aléatoire binaire mesuré](#).
- Mémoire de première année de l'ENS, réalisé avec Paul Thévenin sous la direction de Bastien Mallein (2014). [Généalogie du modèle du voteur](#).

## Teaching

- 2022–2023 In Université de Franche-Comté:  
*Evolutionary biology: probabilistic modeling* (M2)
- 2021–2024 *Elementary Probability* (L2)  
*Programming using Python* (M2)  
*Linear Models* (exercise sessions, M1)  
*Introduction to GNU/Linux and git* (M1)
- 2021–2022 *Analysis* (exercise sessions, L1)
- 2020–2024 *Object-oriented programming – C++ project supervision* (M1)  
*Initiation to modeling with Scilab – practical classes* (prép'agrég)
- 2020–2021 *Statistics for engineers* (ISIFC)
- 2017–2020 Teaching assistant in Sorbonne Université:  
*Integration* (L3, 2017–2019)  
*Power series, integrals depending on a parameter* (L2, 2017–2018)  
*Functional analysis* (L3, 2018–2019)  
*Python programming for mathematics* (L3, 2019–2020)

## Internships

- March – June, 2017 Research internship at *University of California, Berkeley* on several problems about random discrete trees, regenerative permutations. Advising professors: *David Aldous, Jim Pitman*.
- 2016 – 2017 Research internship on random tree models in the SMILE group at *Collège de France (Paris)*, supervised by *Amaury Lambert*. Title of the written dissertation: *Mutations on a Random Binary Tree with a Measured Boundary*.
- February – July, 2015 Internship in R&D at *Criteo (Paris)*. Study and practical testing of a machine learning algorithm.

## Other information

French: mother tongue.

English: very good level.

Computer science and programming:  $\LaTeX$ , good knowledge in algorithmics and in the languages OCaml, Python and C/C++.