Paul Bastide

Researcher in Statistics

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Current Position

2020 – present **Permanent CNRS Researcher**, *IMAG, Université de Montpellier.*

Keywords.
Phylogenetic Comparative Methods. Shift Detection. Model Selection. Phylogenetic Networks.

Past Position

2017 – 2020 **Postdoctoral researcher**, *KU Leuven.*
Bayesian Phylogenetic Comparative Methods applied to virology. With **Philippe Lemey** (KU Leuven) and **Marc Suchard** (UCLA).

Educational Background

2014 – 2017 **PhD Thesis**, *Université Paris Sud.*
Shifted stochastic processes evolving on trees: application to models of adaptive evolution on phylogenies. Supervised by **Stéphane Robin** (MIA, UMR 518 AgroParisTech/INRA) and **Mahendra Mariadassou** (MaIAGE, UR 1404 INRA).

2013 – 2014 **Master2 MathSV**, *Université Paris Sud - École Polytechnique - ENS Cachan.*
Master in Mathematics For Life Sciences, awarded with highest honors.

2010 – 2014 **Grande École**, *École Polytechnique.*
(One of France's leading schools of science and engineering.)
Majoring in Applied Mathematics.

Awards and Fellowships

2019 **FWO long stay abroad grant**, *Research Foundation - Flanders.*
Project based personal grant to visit Marc Suchard in UCLA.

2018 **FWO Fellowship**, *Research Foundation - Flanders.*
Three years project based personal post-doctoral fellowship.

2018 **SFdS PhD Thesis Award**, *French Statistical Society.*
Prix Marie-Jeanne Laurent-Duhamel, for a PhD in Applied Statistics, awarded every three years.

Fall 2015 **Fulbright Scholar**, *University of Wisconsin - Madison.*
To work with **Cécile Ané** at the Departments of Statistics and Botany, and in the **Sytsma Lab**.

Publications and Preprints

preprints — B. S. Teo, J. Rose, **P. Bastide,** and C. Ane. Accounting for intraspecific variation in continuous trait evolution on a reticulate phylogeny. page 2022.05.12.490814, preprints.

— **P. Bastide**, C. Soneson, O. Lespinet, and M. Gallopin. Benchmark of Differential Gene Expression Analysis Methods for Inter-species RNA-Seq Data using a Phylogenetic Simulation Framework. page 2022.01.21.476612, preprints.

2022 — **P. Bastide**, M. Mariadassou, and S. Robin. Modèles d'évolution de caractères continus. In G. Didier and S. Guindon, editors, *Modèles et méthodes pour l'évolution biologique*, pages 47–85. ISTE Group, 2022.

2021 — Z. Zhang, A. Nishimura, **P. Bastide**, X. Ji, R. P. Payne, P. Goulder, P. Lemey, and M. A. Suchard. Large-scale inference of correlation among mixed-type biological traits with phylogenetic multivariate probit models. *The Annals of Applied Statistics*, 15(1):230–251, Mar. 2021, 1912.09185.

— S. Issaka, O. Traoré, R. D. S. Longué, A. Pinel-Galzi, M. S. Gill, S. Dellicour, **P. Bastide**, S. Guindon, E. Hébrard, M.-J. Dugué, Y. Séré, S. Semballa, S. Aké, P. Lemey, and D. Fargette. Rivers and Landscape Ecology of a Plant Virus, Rice Yellow Mottle Virus Along the Niger Valley. *Virus Evolution*, 7(2):veab072, Aug. 2021.

— **P. Bastide**, L. S. T. Ho, G. Baele, P. Lemey, and M. A. Suchard. Efficient Bayesian Inference of General Gaussian Models on Large Phylogenetic Trees. *The Annals of Applied Statistics*, 15(2):971–997, June 2021, 2003.10336.

2020 — S. Lequime, **P. Bastide**, S. Dellicour, P. Lemey, and G. Baele. nosoi: A stochastic agent-based transmission chain simulation framework in r. *Methods in Ecology and Evolution*, 11(8):1002–1007, June 2020.

— S. Dellicour, S. Lequime, B. Vrancken, M. S. Gill, **P. Bastide**, K. Gangavarapu, N. L. Matteson, Y. Tan, L. du Plessis, A. A. Fisher, M. I. Nelson, M. Gilbert, M. A. Suchard, K. G. Andersen, N. D. Grubaugh, O. G. Pybus, and P. Lemey. Epidemiological hypothesis testing using a phylogeographic and phylodynamic framework. *Nature Communications*, 11(1), Nov. 2020.

— G. Baele, M. S. Gill, **P. Bastide**, P. Lemey, and M. A. Suchard. Markov-modulated continuous-time markov chains to identify site- and branch-specific evolutionary variation in BEAST. *Systematic Biology*, May 2020.

2018 — **P. Bastide**, C. Solís-Lemus, R. Kriebel, K. W. Sparks, and C. Ané. Phylogenetic comparative methods on phylogenetic networks with reticulations. *Systematic Biology*, 67(5):800–820, Apr. 2018.

— **P. Bastide**, C. Ané, S. Robin, and M. Mariadassou. Inference of Adaptive Shifts for Multivariate Correlated Traits. *Systematic Biology*, 67(4):662–680, July 2018.

— L. Aristide, **P. Bastide**, S. F. dos Reis, T. M. Pires dos Santos, R. T. Lopes, and S. I. Perez. Multiple factors behind early diversification of skull morphology in the continental radiation of New World monkeys. *Evolution*, 72(12):2697–2711, Dec. 2018.

2017 — C. Solís-Lemus, **P. Bastide**, and C. Ané. PhyloNetworks: A Package for Phylogenetic Networks. *Molecular Biology and Evolution*, 34(12):3292–3298, Dec. 2017.

— **P. Bastide**, M. Mariadassou, and S. Robin. Detection of adaptive shifts on phylogenies by using shifted stochastic processes on a tree. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, 79(4):1067–1093, Sept. 2017, 1508.00225.

— **P. Bastide**. *Shifted stochastic processes evolving on trees: application to models of adaptive evolution on phylogenies.* Phd thesis, Université Paris-Saclay, Oct. 2017, tel-01629648.

2014 — **P. Bastide** and T. David. Discours de réception d'Édouard Estaunié à l'Académie française : définitions croisées de la persona d'un académicien scientifique. *Épistémocritique*, 14(Greffes), 2014.

Softwares

PhylogeneticEM (Main Author) An **R** package for automatic shift detection on phylogenies. Available on the CRAN and on GitHub.

PhyloNetworks (Contributor) A **julia** package for statistical inference, data manipulation and visualization of phylogenetic networks. Available on GitHub.

BEAST (Contributor) A **java** cross-platform program for Bayesian analysis of molecular sequences and continuous traits using MCMC.

nosoi	(Contributor) An **R** package for flexible agent-based stochastic transmission chain/epidemic simulation.
compcodeR	(Contributor) An **R** package for realistic simulation of inter-species RNA-Seq datasets.

Talks and Posters in Conferences

29/06/2022	**MCEB 2022**, *Mathematical and Computation Evolutionary Biology, Château d'Œx, Switzerland*, contributed talk.
24/10/2021	**AMS**, *AMS Sectional Meeting, New Mexico (online)*, **invited contribution** to the session *Mathematics and Modeling of Phylogenetic Networks*.
20/05/2021	**Bio Hasard Workshop**, *Grenoble (online)*, **invited speaker**.
29/07/2019	**JSM 2019**, *Joint Statistical Meeting, Denver*, contributed speed talk.
05/06/2019	**JdS 2019**, *51èmes Journées de Statistique de la SFdS, Nancy*, contributed talk.
21/08/2018	**Evolution 2018**, *Joint Congress on Evolutionary Biology, Montpellier*, contributed talk.
30/05/2018	**JdS 2018**, *50ème Journées de Statistiques de la SFdS, Saclay*, **invited speaker** for the Prix Marie-Jeanne Laurent-Duhamel.
13/06/2017	**MCEB 2017**, *Mathematical and Computation Evolutionary Biology, Porquerolles*, poster.
30/05/2017	**JdS 2017**, *49èmes Journées de Statistique de la SFdS, Avignon*, contributed talk.
28/06/2016	**JOBIM 2016**, *Journées Ouvertes en Biologie, Informatique et Mathématiques, Lyon*, contributed talk.
19/04/2016	**JPS 2016**, *Jeunes Probabilistes et Statisticiens, École de Physique des Houches*, talk.
22/06/2015	**MCEB 2015**, *Porquerolles*, poster.
02/06/2015	**JdS 2015**, *47èmes Journées de Statistique de la SFdS, Lille*, contributed talk.

Seminars and Workshops

12/05/2022	**Dalhousie Statistics Seminar**, *Halifax, Canada (online)*.
08/04/2022	**Toulouse Mathematics and Biology Seminar**, *Toulouse*.
22/03/2022	**Rochebrune Statistics seminar**, *Rochebrune*.
12/10/2020	**IMAG Statistics Seminar**, *Montpellier*.
25/02/2020	**LPSM Statistics seminar**, *Paris Diderot*.
25/10/2019	**TSU Statistics seminar**, *Texas State University*.
25/04/2019	**IMO Statistics seminar**, *Orsay*.
21/01/2019	**MaIAGE Statistics Seminar**, *Jouy-en-Josas*.
19/10/2018	**LBBE Statistics Seminar**, *Lyon*.
28/09/2018	**LaMME Statistics Seminar**, *Évry*.
27/09/2018	**LJK Probability & Statistics Seminar**, *Grenoble*.
15/02/2018	**Meeting of the group "Modélisation Mathématique et Biodiversité"**, *Institut de Mathématique d'Orsay*.
20/11/2017	**Joint Seminar: "Mathématiques, Évolution, Biologie" and Statistics**, *Institut de Mathématiques de Marseilles*.
08/11/2017	**Bioinformatic Seminar (BIG)**, *KU Leuven*.
23/02/2017	**Bioinformatics Team Meeting**, *INRA, Jouy-en-Josas*.
14/11/2016	**StatInfOmics Team Meeting**, *MaIAGE, Jouy-en-Josas*.
04/10/2016	**Journées des maths-info de l'INRA**, *Mallemort*.
27/06/2016	**AgroParisTech Statistics Seminar**, *Paris*.
23/06/2016	**Université Paris Sud Statistics Seminar (PhD Session)**, *Orsay*.

09/06/2016	**Université Paris Descartes PhD Seminar**, *Paris*.
18/05/2016	**EDMH PhD Seminar**, *Paris*.
11/04/2016	**SupAgro Statistics Seminar**, *Montpellier*.
10/02/2016	**Sauquet Lab Botany Seminar**, *Université Paris Sud - Orsay*.
19/11/2015	**Sytsma Lab Botany Seminar**, *University of Wisconsin - Madison*.
18/11/2015	**University of Wisconsin Statistics Seminar**, *Madison*.
22/07/2015	**Morlon Lab Evolution Seminar**, *IBENS, Paris*.
23/06/2015	**SSB Statistics Seminar**, *Jouy-en-Josas*.
16/02/2015	**MaAIGE Internal Seminar**, *Jouy-en-Josas*.

Teaching

2020 – present	**Université de Montpellier**, in French.
	Linear regression. Master level, Statistics.
	Data visualisation. Bachelor level, Computer Sciences.
2021	**IFUM Research School**, *Montevideo*, in English and Spanish.
	Introduction to Phylogenetic Comparative Methods (9h).
2018	**KU Leuven**, *Teaching Assistant*, in English and Dutch.
	Applied Biostatistics. Master level, Biomedical sciences.
	Introduction to Biostatistics. Bachelor level, Biomedical sciences.
2014 – 2017	**Université Paris Sud**, *Teaching Assistant*, in French.
	Introduction to Mathematical Modeling. Bachelor level, Applied Mathematics (L3). [Springs 2015/16/17]
	Introduction to Statistics. Bachelor level, Biology (L2). [Fall 2016]
	Mathematics for Biology. Bachelor level, Biology (L1). [Fall 2016]
	Measure Theory and Probabilities. Bachelor level, Mathematics (L3). [Spring 2016]
	Introduction to Statistics. Bachelor level, Biology (L3). [Fall 2014]
2011 – 2012	**Tutor**, *GEPPM*.
	A national program to help underprivileged high school students to continue their studies after high school. One course a week.

Implication in the Research Community

Reviewer	Systematic Biology, NeurIPS, PNAS, Evolution, Theoretical Population Biology, Evolutionary Bioinformatics, PeerJ, PlosOne, French ANR, Fulbright Program.
Learned Society	Member of the *Société Française de Statistique* (SFdS) and the *Society of Systematic Biologists* (SSB).
SFdS	Member of the "communication" focus work group of the Société Française de Statistiques, responsible for GDPR compliance.
Seminars	Organizer of the IMAG Statistics seminar and the KIM Data and Life Sciences interdisciplinary seminar.
Outreach	"Scoop" highlight on the network PCM paper for the Life Sciences Department of the Université Paris Saclay (`www.scoop.it/t/life-sci-news-upsaclay?q=bastide`)

Skills

French	First language	Programing	R, Rcpp, Julia, Java, Matlab
English	Spoken and written	Desktop tools	MS Office, LaTex, Git
Notions	Russian, Spanish, Dutch		