

CURRICULUM VITÆ (19/01/2024)

Personal information

Nicolas CHAMPAGNAT

Date and place of birth : 26 February 1977, Paris

Nationality : French

Marital status : Married, 3 children

Professional situation : Senior Researcher (Directeur de Recherche de 2^e Classe) at Inria

IECL (Institut Élie Cartan de Lorraine)

Inria BIGS team

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Education

- 18/02/2015 • **HDR (Habilitation to supervise research), Université de Lorraine**
- 2001–2004 • **Ph.D. in Mathematics at Nanterre University (Paris 10)**, supervisor : S. Méléard (Paris 10), biologist co-supervisor : R. Ferrière (ENS Paris) *Defense on 06/12/2004*
- 1997–2001 • **École Normale Supérieure (Paris)**
- 1999–2000 • **Master's degree (DEA) of stochastic modelling and statistics**, Univ. Paris 11 (Orsay)
- **Magistère Fundamental and Applied Mathematics and Informatics (MM-FAI)**, ENS Paris – Univ. Paris 7
- **Agrégation de Mathématiques (highest degree of teaching certification)**
- 1998–1999 • **Master 1 (maîtrise) of Mathematics**, ENS Paris – Univ. Paris 7
- 1997–1998 • **Licence of Mathematics**, ENS Paris – Univ. Paris 7
- 1997 • **Admitted to the competitive examination of École Normale Supérieure, Paris**

Professional experience

- 01/09/2018 • **Senior Researcher (Directeur de Recherche de 2^e Classe)** at Inria Nancy – Grand Est
- 01/07/2011–30/09/2018 • **Researcher (Chargé de Recherche de 1^e Classe)** at Inria Nancy – Grand Est
- 01/09/2008–30/06/2011 • **Researcher (Chargé de Recherche de 1^e Classe)** at Inria Sophia Antipolis – Méditerranée
- 01/09/2006–31/08/2008 • **Researcher (Chargé de Recherche de 2^e Classe)** at Inria Sophia Antipolis – Méditerranée
- 01/09/2005–31/08/2006 • **Post-doc.** at Weiertrass Institute for Applied Analysis and Stochastics (WIAS, Berlin)
- 01/09/2004–31/08/2005 • **Half temporary research and teaching position (ATER)** at Nanterre University (Paris 10)
- 01/09/2001–31/08/2004 • **Ph.D. allocation (Allocation de thèse et Monitorat Normalien)** at Nanterre University (Paris 10)
- 01/09/1997–31/08/2001 • **Pupil at ENS Paris (student civil servant position)**

Articles in peer-reviewed international journals

- [1] 2023 **Champagnat, N., Méléard, S., Mirrahimi, S. and Tran, V.C.** Filling the gap between individual-based evolutionary models and Hamilton-Jacobi equations. *Journal de l'Ecole Polytechnique* **10**, 1247–1275.
- [2] 2023 **Champagnat, N, Hass, V.** Existence, uniqueness and ergodicity for the centered Fleming-Viot process. *Stochastic Processes and their Applications* **166**, 104219.
- [3] 2023 **Champagnat, N., Villemonais, D.** General criteria for the study of quasi-stationarity. *Electronic Journal of Probability* **28**, 1–84.
- [4] 2022 **Benaïm, M., Champagnat, N., Oçafraïn, W. and Villemonais, D.** Transcritical bifurcation for the conditional distribution of a diffusion process. *Journal of Theoretical Probability* DOI : 10.1007/s10959-022-01216-7.
- [5] 2021 **Fritsch, C., Champagnat, N. and Billiard, S.** Identifying conversion efficiency as a key mechanism underlying food web evolution : a step forward, or backward? *OIKOS* **130**(6), 904–930.
- [6] 2021 **Champagnat, N., Villemonais, D.** Convergence of the Fleming-Viot process toward the minimal quasi-stationary distribution. *ALEA - Latin American Journal of Probability and Mathematical Statistics* **18**, 1–15.
- [7] 2021 **Benaïm, M., Champagnat, N. and Villemonais, D.** Stochastic approximation of quasi-stationary distributions for diffusion processes in a bounded domain. *Annales de l'Institut Henri Poincaré (B) : Probabilités et Statistiques* **57**(2), 726–739.
- [8] 2021 **Champagnat, N., Méléard, S. and Tran, V.C.** Stochastic analysis of emergence of evolutionary cyclic behavior in population dynamics with transfer. *Annals of Applied Probability* **31**(4), 1820–1867.
- [9] 2021 **Champagnat, N., Schott, R. and Villemonais, D.** Probabilistic non-asymptotic analysis of distributed algorithms. *Stochastic Analysis and Applications* **36**(6), 981–998.
- [10] 2021 **Champagnat, N. and Villemonais, D.** Lyapunov criteria for uniform convergence of conditional distributions of absorbed Markov processes. *Stochastic Processes and their Applications* **135**, 61–74.
- [11] 2020 **Champagnat, N., Villemonais, D.** Practical criteria for R -positive recurrence of unbounded semigroups. *Electronic Communications in Probability* **25**(6), 1–11.
- [12] 2019 **Andrade-Restrepo, M., Champagnat, N. and Ferrière, R.** Local adaptation, dispersal evolution, and the spatial eco-evolutionary dynamics of invasion. *Ecology Letters* **22**(5), 767–777.
- [13] 2019 **Champagnat, N. and Henry, B.** A probabilistic approach to Dirac concentration in nonlocal models of adaptation with several resources. *The Annals of Applied Probability* **29**(4), 2175–2216.
- [14] 2019 **Champagnat, N. and Claisse, J.** On the link between infinite horizon control and quasi-stationary distributions. *Stochastic Processes and their Applications* **129**(3), 771–798.
- [15] 2018 **Champagnat, N., Villemonais, D.** Uniform convergence of time-inhomogeneous penalized Markov processes. *ESAIM : Probability & Statistics* **22**, 129–162.
- [16] 2018 **Champagnat, N., Coulibaly-Pasquier, K. and Villemonais, D.** Exponential convergence to quasi-stationary distribution for diffusions on Riemannian manifolds. *Séminaires de Probabilités XLIX*, pp. 165–182, Lecture Notes in Mathematics 2215, Springer.
- [17] 2018 **Champagnat, N., Villemonais, D.** Uniform convergence of conditional distributions for absorbed one-dimensional diffusions. *Advances in Applied Probability* **50**(1), 178–203.
- [18] 2018 **Champagnat, N., Jabin, P.-E.** Strong solutions to stochastic differential equations with rough coefficients. *The Annals of Probability* **46**(3), 1498–1541.
- [19] 2017 **Champagnat, N., Villemonais, D.** Uniform convergence to the Q-process. *Electronic Communications in Probability* **22**, paper no. 33, 7 pp.
- [20] 2017 **Campillo, F., Champagnat, N., Fritsch, C.** On the variations of the principal eigenvalue with respect to a parameter in growth-fragmentation models. *Communications in Mathematical Sciences* **15**(7), 1801–1819.

- [21] 2017 **Champagnat, N., Villemonais, D.** Exponential convergence to quasi-stationary distribution for absorbed one-dimensional diffusions with killing. *ALEA - Latin American Journal of Probability and Mathematical Statistics* **XIV**, pp. 177–199.
- [22] 2017 **Baar, M., Bovier, A., Champagnat, N.** From stochastic, individual-based models to the canonical equation of adaptive dynamics - In one step. *The Annals of Applied Probability* **27**(2), 1093–1170.
- [23] 2016 **Champagnat, N., Henry, B.** Moments of the frequency spectrum of a splitting tree with neutral Poissonian mutations. *Electronic Journal of Probability* **21**(53), 1–34.
- [24] 2016 **Campillo, F., Champagnat, N., Fritsch, C.** Links between deterministic and stochastic approaches for invasion in growth-fragmentation-death models. *Journal of Mathematical Biology* **73**(6), 1781–1821.
- [25] 2016 **Salhi, K., Deaconu, M., Lejay, A., Champagnat, N., Navet, N.** Regime switching model for financial data : empirical risk analysis. *Physica A : Statistical Mechanics and its Applications* **461**, 148–157.
- [26] 2016 **Champagnat, N. and Villemonais, D.** Exponential convergence to quasi-stationary distribution and Q-process. *Probability Theory and Related Fields* **164**(1–2), 243–283.
- [27] 2015 **Bossy, M., Champagnat, N., Leman, H., Maire, S., Violeau, L. and Yvinec, M.** Monte Carlo methods for linear and non-linear Poisson-Boltzmann equation. *ESAIM : Proceedings and Surveys* **48**, 420–446.
- [28] 2014 **Champagnat, N., Jabin, P.-E. and Méléard, S.** Adaptive dynamics in a stochastic multi-resources chemostat model. *Journal de Mathématiques Pures et Appliquées* **101**(6), 755–788.
- [29] 2013 **Champagnat, N. and Lambert, A.** Splitting trees with neutral Poissonian mutations II : Large and old families. *Stochastic Processes and their Applications* **123**(4), 1368–1414.
- [30] 2012 **Champagnat, N., Lambert, A. and Richard, M.** Birth and death processes with neutral mutations. *International Journal of Stochastic Analysis* **2012**, article ID 569081, 20 pages.
- [31] 2012 **Campillo, F. and Champagnat, N.** Simulation and analysis of an individual-based model for clonal plant dynamics. *Ecological Modelling* **234**, 93–105.
- [32] 2012 **Champagnat, N. and Lambert, A.** Splitting trees with neutral Poissonian mutations I : Small families. *Stochastic Processes and their Applications* **122**(3), 1003–1033.
- [33] 2012 **Champagnat, N., Diaconis, P. and Miclo, L.** On Dirichlet eigenvectors for neutral two-dimensional Markov chains. *Electronic Journal of Probability* **17**(63), 1–41.
- [34] 2011 **Champagnat, N. and Jabin, P.-E.** The evolutionary limit for models of populations interacting competitively via several resources. *J. Differ. Equations* **251**(1), 179–195.
- [35] 2011 **Champagnat, N. and Méléard, S.** Polymorphic evolution sequence and evolutionary branching. *Probability Theory and Related Fields* **151**(1–2), 45–94.
- [36] 2010 **Champagnat, N., Jabin, P.-E. and Raoul, G.** Convergence to equilibrium in competitive Lotka-Volterra and chemostat systems. *Comptes Rendus Mathématiques de l'Académie des Sciences de Paris* **348**(23–24), 1267–1272.
- [37] 2010 **Champagnat, N., Chipot, C. and Faou, E.** Reconciling alternate methods for the determination of charge distributions : A probabilistic approach to high-dimensional least-squares approximations. *Journal of Mathematical Chemistry* **49**(1), 296–324.
- [38] 2010 **Champagnat, N. and Jabin, P.-E.** Well-posedness in any dimension for Hamiltonian flows with non *BV* force terms. *Commun. Part. Diff. Eq.* **35**(5), 786–816.
- [39] 2010 **Bossy, M., Champagnat, N., Maire, S. and Talay, D.** Probabilistic interpretation and random walk on spheres algorithms for the Poisson-Boltzmann equation in molecular dynamics. *ESAIM - Mathematical Modelling and Numerical Analysis* **44**(5), 997–1048.
- [40] 2009 **Champagnat, N.** Large deviations for singular and degenerate diffusion models in adaptive evolution. *Markov Processes and Related Fields* **15**(3), 289–342.
- [41] 2008 **Champagnat, N., Ferrière, R. and Méléard, S.** From individual stochastic processes to macroscopic models in adaptive evolution. *Stochastic Models* **24** Suppl. 1, 2–44.
- [42] 2008 **Champagnat, N. and Roelly, S.** Limit theorems for conditioned multitype Dawson-Watanabe processes. *Electronic Journal of Probability* **13**, 777–810.

- [43] 2007 **Champagnat, N. and Méléard, S.** Invasion and adaptive evolution for individual-based spatially structured populations. *Journal of Mathematical Biology* **55**, 147–188.
- [44] 2007 **Champagnat, N. and Lambert, A.** Evolution of discrete populations and the canonical diffusion of adaptive dynamics. *The Annals of Applied Probability* **17**, 102–155.
- [45] 2006 **Champagnat, N.** A microscopic interpretation for adaptive dynamics trait substitution sequence models. *Stochastic Processes and their Applications* **116**, 1127–1160.
- [46] 2006 **Champagnat, N., Ferrière, R. et Méléard, S.** Unifying evolutionary dynamics : From individual stochastic processes to macroscopic models. *Theor. Popul. Biol.* **69**, 297–321.
- [47] 2001 **Champagnat, N., Ferrière, R. et Ben Arous, G.** The canonical equation of adaptive dynamics : a mathematical view. *Selection* **2** 73–83.

Articles in peer-reviewed proceedings

- [48] 2023 **Champagnat, N., Méléard, S. and Tran, V.C.** Multi-scale eco-evolutionary models : from individuals to populations. *Proceedings of the International Congress of Mathematics ICM 2022, vol. VII, pp. 5656–5678.* DOI : 10.4171/icm2022/24
- [49] 2008 **Champagnat, N., Ferrière, R. and Méléard, S.** *Individual-based probabilistic models of adaptive evolution and various scaling approximations.* In : Seminar on Stochastic Analysis, Random Fields and Applications V, Centro Stefano Franscini, Ascona, May 2005, Eds. Robert C. Dalang, Marco Dozzi and Francesco Russo, Progress in Probability vol. **59**, Birkhäuser, pp. 75–114.
- [50] 2008 **Champagnat, N. and Lambert, A.** *Adaptive dynamics in logistic branching populations.* Stochastic Models in Biological Sciences, Banach Center Publ. **80**, 235–244.

Articles in peer-reviewed scientific encyclopedias

- [51] 2010 **Bossy, M. and Champagnat, N.** *Markov processes and parabolic partial differential equations.* Encyclopedia of Quantitative Finance, Wiley.

Submitted preprints

- [52] 2021 **Benaïm, M., Champagnat, N., Oçafrain, W. and Villemonais, D.** *Degenerate processes killed at the boundary of a domain.*
- [53] 2022 **Benaïm, M., Champagnat, N., Oçafrain, W. and Villemonais, D.** *Quasi-compactness criterion for strong Feller kernels with an application to quasi-stationary distributions.*
- [54] 2022 **Champagnat, N. and Villemonais, D.** *Quasi-stationary distributions in reducible state spaces.*
- [55] 2023 **Champagnat, N, Hass, V.** *Convergence of individual-based models with small and frequent mutations to the canonical equation of adaptive dynamics.*
- [56] 2023 **Champagnat, N., Strickler, E. and Villemonais, D.** *Uniform Wasserstein convergence of penalized Markov processes.*
- [57] 2023 **Loubaton, R., Champagnat, N., Vallois, P. and Vallat, L.** *MultiRNAflow : integrated analysis of temporal RNA-seq data with multiple biological conditions.*

Reports of industrial collaboration

- [58] 2014 **Champagnat, N., Deaconu, M., Lejay, A. and Bedoui, A.** *Analyse de dépendance d'actifs financiers par la méthode des copules.* Final report of collaboration between Alphability and the TOSCA team of Inria Nancy – Grand Est.
- [59] 2013 **Champagnat, N., Deaconu, M., Lejay, A. and Salhi, K.** *Mesure de risque : détection du régime de crise et calcul de la Value-at-Risk.* Final report of collaboration between Alphability and the TOSCA team of Inria Nancy – Grand Est.

- [60] 2012 **Boukherouaa, S., Champagnat, N., Deaconu, M. and Lejay, A.** *Mesure de risques : calcul de la Value-at-Risk et application à la gestion de portefeuilles*. Final report of collaboration between Alphability and the TOSCA team of Inria Nancy – Grand Est.
- [61] 2009 **Champagnat, N., Maroso, S., Talay, D. and Tanré, E.** *Numerical approximation for impulse control problem with delay*. Final report of collaboration between NATIXIS and the TOSCA team of Inria Sophia Antipolis – Méditerranée.

Recent involvements in research projects

- **Target project “DyLT” of PEPR Maths VIVES (2024–2029)** “Dynamics of telomeres length” involving mathematicians, biologists and physicians from Nancy, Saclay, Marseille et Nice. *Coordinator : Nicolas Champagnat.*
- **Project ITMO Cancer “Predi-CLL” (2023–2027)** “Quantifying and predicting the evolution of clonal heterogeneity in chronic lymphocytic leukemia” (INSERM funding) involving the BIGS team and CHRU Strasbourg. *Coordinator : Nicolas Champagnat.*
- **ERC SINGER (2022–2027)** “Stochastic dynamics of sINgle cells” (AdG 101054787), as scientific collaborator. *Coordinator : Sylvie Méléard.*
- **Member of the Biostochastic Research Network (2018–2022)** between Universidad de Valparaíso, Inria and Université de Lorraine. *Coordinator : Antoine Lejay.*
- **ITMO Cancer project (2017-2022)** “Modeling ctDNA dynamics for detecting targeted therapy resistance” (INSERM funding) involving IECL, ICL (Institut de Cancérologie de Lorraine) and CHRU Strasbourg, *coordinator : Nicolas Champagnat*
- **Member of the Chair “Modélisation Mathématique et Biodiversité” (2017–2027)** between VEOLIA, Ecole Polytechnique, Museum National d’Histoire Naturelle and Fondation X (funded by VEOLIA). *Coordinator : Sylvie Méléard.*
- **Contract with Alphability (2012–2016, renewed yearly) :** these are research contracts between the SME Alphability and the TOSCA team of Inria Nancy – Grand Est on risk measures, *coordinator : Madalina Deaconu (Inria Nancy)*
- **ANR NONLOCAL** (Phénomènes de propagation et équations non locales, 2014–2019), *coordinator : François Hamel (CNRS, Marseille)*
- **PEPS BMI “Host-pathogens coevolution”** (2012–2013) *coordinator : Régis Ferrière (ENS Paris and Univ. Arizona)*
- **ANR MANEGE** (Stochastic models in evolution and genetics, 2009–2014), *coordinator : Sylvie Méléard (Ecole Polytechnique)*
- **ANR SYSCOM MODECOL** (Virtual grasslands and clonal plants, 2009–2012), *coordinator : Cendrine Mony (Univ. Rennes 1)*
- **Contract with NATIXIS (2007–2010) :** this is a research contract between NATIXIS and the TOSCA team of Inria Sophia Antipolis – Méditerranée on option hedging under transaction constraints. *Coordinator : Denis Talay (Inria Sophia Antipolis)*
- **ANR MAEV** (Stochastic modelling of Evolution, 2005–2009), *coordinator : Etienne Pardoux.*

Students supervision (since 2008)

- Post-doc.**
- Léo Darrigade (Ph.D. in Université Paris Saclay), Apr. 2021–Aug. 2022, ITMO Cancer funding, on “Inference of heterogeneous tumor growth from circulating tumor DNA data”.
 - William Oçafrain (Ph.D. in Université de Toulouse), Oct. 2020–Apr. 2022, Inria funding, on “Quasi-stationary distributions for time inhomogeneous and hypoelliptic Markov processes”.
 - Édouard Strickler (Ph.D. in Université de Neuchâtel), Oct. 2019–Sep. 2020, Inria funding, on “Quasi-stationary distributions : convergence in Wasserstein distance and numerical approximation”.
 - Ulysse Herbach (Ph.D. in DRACULA Inria team, Lyon), Nov. 2018–Dec. 2019, ITMO Cancer funding, on “Prediction of resistance to a targeted therapy using circulating tumor DNA”. He has now a CR position at Inria Nancy – Grand Est.

- Coralie Fritsch (Ph.D. in MODEMIC Inria team, Montpellier), Jan. 2015–Mar. 2016, Inria funding, on “Numerical approximation of stochastic individual-based models from Ecology and Adaptive Dynamics” and Aug. 2016, July 2017, Chaire MMB (École Polytechnique) funding, on “Adaptive dynamics of food webs”. She has now a CR position at Inria Nancy – Grand Est.
 - Denis Villemonais (Ph.D. in Ecole Polytechnique), Dec. 2011–Aug. 2012, Inria funding, on “Quasi-stationary distributions and adaptive dynamics”. He now has a MCF position in Univ. Lorraine since 2012
- Ph.D. theses**
- Anouar Jeddi, since Sep. 2023, co-supervision with Sylvie Méléard (Ecole Polytechnique), funding ERC SINGER, on “Convergence of individual-based population models to Hamilton-Jacobi equations”.
 - Virgile Brodu, since Oct. 2022, co-supervision with Coralie Fritsch (Inria Nancy) and Sylvain Billiard (Univ. Lille), funding monitorat normalien (ENS Lyon), on “Emergence of allometries in ecological systems : stationary behavior of deterministic and stochastic models and flux of energy and biomass”.
 - Anouk Rago, since Oct. 2021, co-supervision with Anne Gégout-Petit (Univ. Lorraine), ANR funding, on “Inference of dynamical gene networks and prediction of biological intervention experiments in cancer cells”.
 - Rodolphe Loubaton, since Oct. 2018, co-supervised with Laurent Vallat (MCUPH, CHU Strasbourg), funding from Région Grand Est, on “Identification of therapeutic targets using prediction of knock-out experiments on models of gene networks”.
 - Vincent Hass, Sep. 2018–Sep. 2023, funding from Inria Nancy – Grand Est, on “Adaptive dynamics of population models under assumption of small mutations or rare advantageous mutations”.
 - Benoît Henry, Oct. 2013–17/11/2016, co-supervised with Dave Ritchie (Inria Nancy), funding from FCH and Région Lorraine, on “Processus de branchements non markoviens en dynamique et génétique des populations”. He is now Post-doc. in LORIA, Univ. Lorraine.
 - Julien Claisse, Oct. 2009–04/07/2014, co-supervised with Denis Talay (Inria Sophia), AMN funding, on “Dynamique des populations : contrôle stochastique et modélisation hybride du cancer”. He is now Post-doc. in CMAP, Ecole Polytechnique.
 - Nicolas Perrin, Oct. 2009–20/03/2013, co-supervised with Denis Talay (Inria Sophia), Inria CORDI funding, on “Stochastic methods in molecular dynamics”. He is now Quantitative Analyst at J. P. Morgan (London).
- M2 internships**
- Anouar Jeddi (M2 “Mathématiques pour les Sciences du Vivant”, Univ. Saclay), Virgile Brodu (M2 “Mathématiques avancées – Probabilités et Statistiques”, ENS Lyon), Vincent Hass (M2 “Mathématiques pour les Sciences du Vivant”, Univ. Paris Sud), Ameni Kantassi (M2 “double diplôme” Univ. Lorraine and ESSTHS, Hammam Sousse, Tunisia), Rinel Foguen Tchuendom (Msc. Mathmods, Erasmus Mundus, co-supervised with A. Lejay), Tatiana Piccolomini (Univ. Buenos Aires, co-supervised with A. Lejay), Benoît Henry (Univ. Lorraine), Khaled Salhi (EPT, Tunis, co-supervised with M. Deaconu), Martin Andrade (Erasmus in Ecole Polytechnique, co-supervised with R. Ferrière), Julien Claisse (ENS Cachan, co-supervised with D. Talay), Souhail Boukherouaa (Ecole des Mines de Nancy, co-supervised with M. Deaconu and A. Lejay), Xavier Aubert (ISITV, Univ. Toulon, co-supervised with M. Bossy).
- Projets 3A/M2**
- Sinyuan Yao (École des Mines de Nancy), Othmane Sammari (École des Mines de Nancy), Gauthier Poinset (École des Mines de Nancy), Tiphaine Obara (Univ. Lorraine).
- Projet recherche**
- Aliénor Hémet (École des Mines de Nancy), co-supervised with Édouard Strickler ; Antoine Bichat (École des Mines de Nancy), co-supervised with P. Vallois (Univ. Lorraine).

Scientific events organization (since 2008)

- Member of the Organizing Committee of the conference “A Random Walk in the Land of Stochastic Analysis and Numerical Probability”, CIRM, Luminy, 4–8 Sep. 2023.
- Co-organisor with D. Villemonais (Univ. Lorraine) of an invited session on “Quasi-stationary distributions in numerical stochastic methods and statistics” at the conference APS INFORMS 2023, Nancy, 28–30 June 2023.
- Member of the Scientific Committee of “JdS 2022, 53èmes Journées de Statistique de la Société Française de Statistique”, Univ. Lyon, May 2022.
- Member of the Organizing Committee of the Journée Scientifique de la Fédération Charles Hermite “COVID-19”, Inria Nancy – Grand Est, 28 Sep. 2021.
- Member of the Organizing Committee of the workshop “Modélisation de l’hétérogénéité tumorale et thérapies ciblées”, IECL, Univ. Lorraine, 24–25 June 2021.
- Member of the Organizing Committee of the Conference “Mathematical Models in Evolutionary Biology”, part of the Thematic Month on Mathematical Issues in Biology, CIRM, Luminy, 10–14 Feb. 2020.
- Member of the Organizing Committee of the Workshop “Modélisation de l’hétérogénéité tumorale et thérapies ciblées”, IECL, Univ. Lorraine, 21–22 Oct. 2019.
- Member of the Organizing Committee of the Conference ReaDiNet 2019 “Mathematical Analysis for Biology and Ecology”, Inria Nancy – Grand Est, 23–25 Sep. 2019.
- Member of the Program Committee of CARI 2016 (13e Colloque Africain sur la Recherche en Informatique et Mathématiques Appliquées), Tunis, 10–14 Oct. 2016.
- Co-organizer with M. Deaconu (Inria Nancy) of a mini-symposium on “Un panorama de progrès récents sur les méthodes numériques probabilistes” at the CANUM 2016 in Obernai in July 2016.
- Member of the organizing committee (with T. Lelièvre and A. Nouy) of the CEMRACS 2013 on “Modelling of complex systems : stochastic and deterministic approaches”, CIRM, Marseille, July–August 2013. It is composed of one week of school for Ph.D. and post-doc students, followed by 5 weeks of work on research projects, mostly industrial, in small groups.
- Member of the organizing committee (with T. Lelièvre and A. Nouy) of the Special Event “Mathématiques pour la planète Terre” held at CIRM, Luminy, on 23/07/2013.
- Co-organizer with D. Ritchie of a Journée Scientifique de la Fédération Charles Hermite on “Ancestral Inference and Evolutionary Relationships in Biology” at Inria Nancy - Grand Est in Sep. 2013.
- Organizer of a mini-symposium on “Quasi-stationary distributions and Q -processes” at the Congrès SMAI 2013 in Seignosse in May 2013.
- Member of the organizing committee of the Summer School of the ANR MANEGE on “Stochastic models in ecology, genetics and evolution”, Agay (June 2011).
- Member of the organizing committee of the Summer School of the ANR MAEV on “Evolutionary Biology and Probabilistic Models”, La Londe les Maures (Septembre 2008).
- Co-responsible with Romain Azaïs (Inria Nancy and IECL) of Seminar on probability and statistics of IECL (since Sep. 2016).
- Responsible for the “Groupe de travail généraliste de probabilités et statistique” of IECL (Sep. 2012–Jan. 2013).
- Responsible for the TOSCA seminar of Inria Sophia Antipolis – Méditerranée (2007–2011).

Editorial activity

- Co-editor in chief (with Béatrice Laurent-Bonneau, IMT Toulouse) of *ESAIM : Probability and Statistics*, June 2017–June 2021.
- Member of the Editorial Board of *Stochastic Models* since Oct. 2013 and *ESAIM : Probability and Statistics* since Dec. 2016.
- Co-editor in chief of the special issue of *ESAIM : Proceedings and Surveys* (vol. 48, Jan. 2015), devoted to the CEMRACS 2013.

Scientific expertise, juries

- Expert for research projects submitted to Shape-Med@Lyon, the ESF FWO's 2020 Call for Junior and Senior Research Projects, Natural Sciences and Engineering Research Council of Canada, the Israel Science Function (twice), to the ANR (five times), to the Leverhulme trust (UK) and FONDECYT/CONICYT (Chile, twice), since 2011.
- Participation to 4 hiring committees for permanent junior researcher positions (chaire CNRS-MCF of Univ. Rennes 1 in 2009, position MCF0202(67) in Univ. Nice – Sophia Antipolis in 2011, position MCF1816(26) in Univ. Lyon 1 in 2011 and position MCF1219(26) in Univ. Toulouse 3 in 2015).
- Examiner for the HDR of Nicolas Gast (Inria Grenoble, 30/01/2020).
- Referee for the Ph.D. theses of Léo Meyer (Univ. Orléans, 09/10/2023), Van Hai Thai (Univ. Nantes, 28/09/2023), Imane Akjouj (Univ. Lille, 29/06/2023), Anaïs Rat (Aix-Marseille Univ., 31/05/2023), Apolline Louvet (Institut polytechnique de Paris, 07/06/2022), Julie Tourniaire (Institut Polytechnique de Paris, 13/12/2021), Felipe Munoz-Hernandez (Institut Polytechnique de Paris, 26/11/2021), Maxime Berger (Univ. PSL, 21/06/2021), Léo Darrigade (Univ. Paris Saclay, 16/12/2020), Aurélien Velleret (Aix-Marseille Univ., 09/07/2020), Paulien Jeunesse (Univ. Paris Dauphine, 08/01/2019), Simon Girel (Univ. Lyon 1, 13/11/2018), Brice Samegni-Kepgnou (Aix-Marseille Univ., 13/07/2017), Nils Caillerie (Univ. Lyon 1, 05/07/2017), Elma Nessar (AMU, 04/07/2016), Joseba Dalmau (Univ. Paris Sud, 25/11/2016), Cristobal Quininao (UPMC, 02/06/2015) and Marie-Noémie Thai (Univ. Paris Est, 27/11/2015).
- President of the Ph.D. committee of Aleksian Ashot (Univ. Saint-Etienne, 20/11/2023).
- Examiner for the Ph.D. theses of Rodolphe Loubaton (Univ. Lorraine, 21/12/2023), Vincent Hass (Univ. Lorraine, 26/09/2023), Frédérique Robin (Univ. Paris Saclay, 26/09/2019), William Oçafrain (Univ. Toulouse 3, 4/07/2019), Martin Andrade-resptrepo (Univ. Paris 7, 26/06/2019), Edouard Strickler (Univ. Neuchâtel, 21/03/2019), Rim Touibi (Univ. Lorraine, 08/12/2018), Manon Baudel (Univ. Orléans, 01/12/2017), Benoit Henry (Univ. Lorraine, 17/11/2016), Lucas Mercier (Univ. Lorraine, 11/05/2016), Coralie Fritsch (Univ. Montpellier 2, 08/12/2014), Claire Christophe (Univ. Toulouse 3, 02/12/2014), Julien Sainte-Marie (Univ. Lorraine, 09/09/2014), Julien Claisse (Univ. Nice – Sophia Antipolis, 4/07/2014), Nicolas Perrin (Univ. Nice – Sophia Antipolis, 28/03/2013), Mathieu Richard (UPMC, 05/12/2011), Majid Salamat (Aix-Marseille Univ., 14/03/2011).

Research administration activity

- Elected member of the *Commission d'Evaluation* of Inria, Sep. 2023–Aug. 2027.
- Member of the coordination committee of MODCOV19, a platform of coordination of research actions about modeling of SARS-CoV-2 (Covid-19) pandemic, Apr. 2020–Dec. 2021. I was responsible of the bibliographic awareness group.
- Member of the COMIPERS (hiring committee for non-permanent positions) of Inria Nancy – Grand Est since Jan. 2017.
- Substitute member of the *Comité de Centre* of Inria Nancy – Grand Est since Oct. 2020.
- Member of the *Comité de Centre* of Inria Nancy – Grand Est Oct. 2016–Sep. 2020.
- Local responsible of GdR MAMOVI for Univ. Lorraine Sep. 2016–Aug. 2022.
- Local researcher (*correspondant local*) representing the COERLE (Inria's Ethic Committee) at Inria Nancy – Grand Est since May 2014.
- *Responsable scientifique* for the library of Mathematics of IECL (Institut Élie Cartan de Lorraine), Nov. 2015–Oct. 2023.
- Member of the *Conseil de Laboratoire* (as *responsable scientifique* of the library) of IECL Nov. 2015–Oct. 2019.
- Member of the *Commission Information et Edition Scientifique (IES)* of Inria Nancy – Grand Est since Sep. 2015.
- Substitute member of the *Comité de Centre* of Inria Nancy – Grand Est Sep. 2013–Sep. 2016.
- Member of the *Commission de Développement Technologique (CDT)* of Inria Nancy – Grand Est Sep. 2012–Aug. 2016.
- Member of the *Commission bibliothèque* of IECL between Sep. 2012 and Oct. 2015.
- Elected member of the *Comité de Centre* of Inria Sophia Antipolis – Méditerranée (2008–2011).
- Elected member of the *Comité des Projets* of Inria Sophia Antipolis – Méditerranée (2008–2011).

Teaching activities (since 2008)

In 2020 : Mini-course on “Population dynamics with extinction and quasi-stationary distributions” at the Research School of the “Chaire Modélisation Mathématique et Biodiversité” at Aussois, 13–17 September.

In 2018 : Mini-course on “Mathematical modeling with measures : stochastic approaches in ecology and evolution” at the Workshop “Mathematical Modeling with Measures : Where Applications, Probability and Determinism Meet” at Lorentz Center, Leiden, the Netherlands, 3–7 December.

2017–2021 : Lectures on “Problèmes inverses” at Ecole des Mines de Nancy 2A, 15h per year, 10–15 students.

In 2017 : Mini-course on “Large population scalings of stochastic population dynamics in ecology and evolution” at the Workshop/School on Stochastic PDEs, Mean Field Games and Biology at the Gran Sasso Science Institute (GSSI) in September in L’Aquila (Italy), 4h, 30 students.

In 2017 : Mini-course on “Quasi-Stationary Distributions for absorbed Markov processes” at the School on “New trends in Markov Processes” of the Swiss Doctoral Program in Mathematics in March in Les Diablerets (Switzerland), 6h, 15 students.

In 2016 : Mini-course on “Some stochastic models in Eco-evolution” at the CIMPA School “Mathématiques pour la Biologie” in October in Tunis, 4h, 40 students.

2016–2017 : Lectures on “Chaînes de Markov” (M2 double-diplôme Univ. Lorraine – ESSTHS) at École Supérieure des Sciences et de la Technologie de Hammam Sousse, Tunisia, 15h, 10 students.

2015–2016 : Lectures on “Processus de Galton-Watson” (M2 double-diplôme Univ. Lorraine – ESSTHS) at École Supérieure des Sciences et de la Technologie de Hammam Sousse, Tunisia, 15h, 10 students.

2013–2015 : Lectures on “Processus de Markov et génétique des populations” at M2 MFA (Mathématiques Fondamentales et Appliquées) of Univ. Lorraine, 15h, 6 students for each year.

2011–2024 : Lectures on “Introduction à la Finance Quantitative” at Ecole des Mines de Nancy 2A (IM and ISDP) and 3A (PEE), $9 + 12 = 21$ h per year, 50 students in 2A, 20 students in 3A.

2013–2014 : Lectures on “Génétique des Population et Généalogies Aléatoires” (M2) at École Supérieure des Sciences et de la Technologie de Hammam Sousse, Tunisia, 15h, 15 students.

2011–2012 : Lectures on “Génétique des populations et généalogies aléatoires” at M2 MFA of Univ. Lorraine, 30h, 6 students.

In 2012 : Mini-course on “Modèles stochastiques individu-centrés en dynamique adaptative et étude du branchement évolutif” at the Summer School on “Modélisation en dynamique des populations et Évolution : Probabilités et EDP” in September at La Londe les Maures, 4h, 30 students.

2011–2012 : Lectures on “Introduction à la Finance Quantitative” at ICN Business School, Nancy, M1, 18h, 80 students.

2010–2011 : Lectures on “Méthodes des différences finies et analyse numérique matricielle” at M2 IMAFA of EPU (Ecole Polytechnique de l’Université de Nice-Sophia Antipolis), 12h, 20–25 students.

2008–2011 : Partly with M. Bossy, lectures and exercice classes on “modèles mathématiques continus pour la finance” at M2 IMAFA of EPU (Ecole Polytechnique de l’Univ. Nice-Sophia Antipolis), 25h, 15–20 students.

Participations to conferences and congresses as plenary speaker

- 2023 • **11ème Biennale Française des Mathématiques Appliquées et Industrielles (Congrès SMAI 2023)** *Le Gosier, Guadeloupe (May)*
- 2013 • **57th Annual Meeting of the Australian Mathematical Society** *Sydney, Australie (septembre)*

Recent participations to conferences and congresses as invited speaker

- 2023
 - “International Conference on Recent Developments of Theory and Methods in Mathematical biology”, conference of the IRN ReaDiNet network *NCTS Taipei, Taiwan* (October).
 - Conference “A random walk in the land of stochastic analysis and numerical probability” *CIRM, Luminy* (September).
 - 43rd Conference on Stochastic Processes and their Applications *Lisbonne, Portugal* (July).
 - Conference “Celebrating the mathematics of Michel Benaïm” *Bernoulli Center, Lausanne* (August).
- 2022
 - Journées de Probabilités 2022 *Orbey, France* (May).
 - Workshop “Pólya urns, stochastic approximation and quasi-stationary distributions” *University of Bath* (April).
 - Oberwolfach workshop on Population Dynamics and Statistical Physics in Synergy *Mathematisches Forschungsinstitut Oberwolfach, Allemagne* (March).
- 2020
 - Workshop on Stochastic Processes under Constraints *Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany* (September).
- 2018
 - ICMS Workshop on Wasserstein calculus and related topics *Bayes Center, Edinburgh* (November).
 - Conference “Populations : Interactions and Evolution” *IHP, Paris* (September).
 - Conference on Advances in Statistical Mechanics *CIRM, Luminy* (August).
 - MCQMC 2018 *Rennes* (July).
 - Conference on Probability and Biological Evolution *CIRM, Luminy* (June).
- 2017
 - Conference on Ecology and evolutionary biology, deterministic and stochastic models *Toulouse* (October).
 - Conference on Quasistationary Distributions : Analysis and Simulation *Paderborn, Germany* (September).
- 2016
 - Conference on Probabilistic structures in deterministic population genetics *Vienna, Austria* (November).
 - Conference on Stochastic PDE’s, Large Scale Interacting Systems and Applications to Biology *Orsay* (March).
- 2015
 - Colloque Franco-Maghrébin en Analyse Stochastique *Nice* (November).
 - MMEE 2015 conference “Mathematical Models in Ecology and Evolution” *Paris* (July).
 - Conference on Probability and Biological Evolution *CIRM, Luminy* (June).
- 2014
 - 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications *Madrid* (July).
- 2013
 - Conference on “Stochastic Models in Ecology, Evolution and Genetics” (SMEEG 2013) *Angers* (December).
 - Congrès SMAI 2013 *Seignosse* (May).
 - Conference on “Biological invasion and evolutionary biology : stochastic and deterministic models” *Lyon* (March).
 - Conference on “Genetic models and quasi-stationarity” *CIRM, Luminy* (March).
- 2012
 - XI-th French-Romanian Congress of Applied Mathematics (CFR2012) *Bucarest, Romania* (August).
 - 6th European Congress of Mathematics (6ECM) *Krakow, Poland* (July).
 - Conference on “Probability, Population Genetics and Evolution” *CIRM, Marseille* (June).
- 2010
 - Conference on “Modeling Clonal Plant Growth : from Ecological Concepts to Mathematics” *Rennes* (June)

- **IMS Conference 2010** *Gothenburg, Sweden* (August)
- 2009 • **4th International Conference on Bio-Inspired Models of Network, Information and Computing Systems (BIONETICS 2009)** *Avignon* (December)
- **11th CLAPEM (Latino-American Congress of Probability and Mathematical Statistics)** *Caracas, Venezuela* (November)
- **57th Sessions of the International Statistics Institute (ISI 2009)** *Durban, South Africa* (August)
- **27th European Meeting of Statisticians (EMS 2009)** *Univ. Toulouse 3* (July)
- **Conference on Probabilistic Models of Evolutionary Biology** *CIRM, Marseille* (May)
- 2008 • **Conference on Bioinformatics Modeling in Biology and Medicine** *Univ. of Nice – Sophia Antipolis* (October)
- **Journées MAS de la SMAI** *Univ. Rennes 1* (August)
- **2nd Canada France Congress** *Montréal, Canada* (June)
- **Conference on Inhomogeneous Random Systems** *IHP, Paris* (January)
- 2007 • **Conference MMEE 2007 (Mathematical Models in Evolution and Ecology)** *University of Sussex, UK* (September)
- 2006 • **Conference on mathematical population genetics** *Edinburgh, UK* (March)

Recent participations to workshops and summer schools as invited speaker

- 2023 • **Ecodep-Biostochastic Workshop : Modelling Time Series and Stochastic Processes** *Las Cruces Marine Station, Chili* (March).
- 2022 • **Scientific day “Eco-Evo-Math : Building on Twenty Years of Research and Training at the Crossroads of Ecology, Evolution, and Mathematics”** *ENS Paris* (July).
- **AG du département BioSiS du CRAN** *Univ. Lorraine, Nancy* (May).
- **Journée cancérologie : innovations et expérience patient, d’hier à demain** *CHRU Nancy* (April).
- 2021 • **Journées Scientifiques du GE2MI sur “EDP et modèles biomathématiques”** *Univ. Côte d’Azur (online)* (December).
- **Workshop Biostochastic Networks 2021** *Univ. Valparaiso (online)* (November).
- 2019 • **Journée Charles Hermite “Modélisation fine versus outils d’analyse et simulation, un problème d’échelle”** *IECL, Nancy* (June).
- 2018 • **Cancéropôle Est : Journée mathématique et informatique pour l’analyse des données et imagerie en oncologie** *Institut de Cancérologie de Lorraine, Nancy* (June).
- **Journées de l’ANR NONLOCAL** *Chambery* (March).
- 2017 • **Workshop on Singular McKean-Vlasov equations and their applications** *Sophia Antipolis* (September).
- **Workshop/School on Stochastic PDEs, Mean Field Games and Biology** at the Gran Sasso Science Institute (GSSI) *L’Aquila, Italy* (September).
- **Journées Scientifiques Inria 2017** *Sophia Antipolis* (June).
- **Workshop on Multi-Scale Features of Selection in Population Genetics, Eurandom** *Eindhoven, The Netherlands* (March).
- **Doctoral School “New Trends in Markov Processes”** *Les Diablerets, Switzerland* (March).
- **Journées EDP pour la biologie évolutives** *Avignon* (March).
- 2016 • **CMO-BIRS workshop Stochastic and Deterministic Models for Evolutionary Biology** *Oaxaca, Mexico* (August).
- 2015 • **Workshop on Probabilistic Models in Biology** *Playa del Carmen, Mexico* (October).

- 2014
 - **Workshop on “Discrete, explicit simulations versus continuous, aggregated models”** *Lausanne* (October).
 - **Workshop “Population Dynamics and Statistical Physics in Synergy”** *Eindhoven, Netherlands* (August).
 - **Schlumberger workshop on Topics in Applied Probability** *IHES, Bures-sur-Yvette* (March).
- 2013
 - **Workshop “Mathematics for Planet Earth” of the Fédération Charles Hermite** *Nancy* (October).
- 2012
 - **Workshop “Modèles stochastiques pour l’écologie et la biologie” of the Labex Numev** *Montpellier* (October)
 - **Lectures at the Summer School on “Modélisation en dynamique des populations et Évolution : Probabilités et EDP”** *La Londe les Maures* (Septembre).
 - **MBI Workshop on “Evolution and Spread of Disease”** *Columbus, Ohio, USA* (March).
- 2011
 - **Lectures at the Summer School and Workshop on “Modèles mathématiques de la dynamique des populations”** *Ecole Polytechnique de Tunisie, La Marsa, Tunisia* (April)
- 2009
 - **Inauguration of the Chaire Ecole Polytechnique–MNHM–Veolia “Modélisation Mathématique et Biodiversité”** *Museum National d’Histoire Naturelle, Paris* (November)
 - **Workshop on Mathematical Biology** *HIM, Bonn, Germany* (October)
 - **Session “Etat de la Recherche de la SMF” on “Applications des Mathématiques en Sciences du Vivant”** *IHP, Paris* (October)

Recent seminar talks and colloquia

- 2023
 - **Seminar of differential equations, Instytut Matematyczny** *Wroclaw, Poland (remote)* (novembre)
- 2019
 - **Colloquium of the Department of Mathematics and Computer Science** *University of Technology, Eindhoven, The Netherlands* (February)
- 2018
 - **Colloquium at LAREMA** *Angers* (January)
- 2017
 - **Séminaire Modélisation Mathématiques et Calcul Scientifique de l’Institut Camille Jordan** *Lyon 1* (November)
 - **Séminaire du LPMA** *Paris 6* (February)
 - **Colloquium of the Mathematical Institute** *Mainz, Germany* (February)
 - **Séminaire de statistique** *Avignon* (January)
 - **Séminaire de probabilités et statistique du LMV** *Versailles* (January)
 - **Séminaire Calcul Stochastique de l’IRMA** *Strasbourg* (January)
- 2016
 - **Séminaire Méthodes probabilistes et statistiques en dynamique des populations** *Grenoble* (December)
 - **Séminaire de probabilités du MAPMO** *Orléans* (October)
 - **Séminaire TOSCA** *Sophia Antipolis* (April)
- 2014
 - **Séminaire de Statistique et Probabilités Appliquées** *Grenoble* (November)
 - **Séminaire PEIPS (Population Evolution and Interacting Particle Systems)** *CMAP, Ecole Polytechnique* (November)
 - **Séminaire Modèles Probabilistes pour la Biologie** *Montpellier* (January)
- 2013
 - **Oberseminar Stochastics of the Probability Theory and Stochastic Analysis Group** *Bonn, Germany* (June)
 - **Mark Kac seminar on Stochastics and Physics** *Utrecht, Netherlands* (May)
- 2012
 - **Séminaire de Probabilités de l’Institut de Mathématiques de Toulouse** *Toulouse* (November)

- **Rencontres de la Chaire MMB (Modélisation Mathématique et Biodiversité)** *Ecole Polytechnique* (June)
- **SMILE Seminar on Stochastic Models for the Inference of Life Evolution** *Collège de France, Paris* (March)
- 2011 • **Réunion de l'ANR MANEGE** *Ecole Polytechnique, Palaiseau* (February)
- **Séminaire de mathématiques du vivant** *Univ. Bordeaux 1* (January)
- 2010 • **Séminaire de probabilités et statistique** *Univ. Montpellier 2* (December)
- **Séminaire de probabilités** *Univ. Paris 6 & 7* (December)
- **Séminaire de biologie mathématique** *Univ. Lyon 1* (December)
- 2009 • **Journée thématique MEG sur les "Modèles Mathématiques déterministes et stochastiques de populations en interaction"** *Luminy, Marseille* (March)
- **Journées "Dynamiques Adaptatives" de l'ANR MAEV** *Univ. Paris 5* (February)
- 2008 • **Séminaire Mathématiques, Evolution, Génôme** *Univ. de Provence, Marseille* (December)
- **Séminaire Bio-Maths** *Univ. Lyon 1* (November)
- **Séminaire du LATP** *Marseille* (June)
- **Séminaire de probabilités** *Univ. Bordeaux 1* (April)
- **Séminaire du Groupe de Travail Applications des Mathématiques** *ENS Cachan, Ker Lann* (March)
- 2007 • **Séminaire "Modèles de Populations"** *INRA Avignon* (December)
- **Séminaire "Maths et Vivant"** *INRIA Sophia Antipolis* (December)
- **Séminaire de Probabilités** *Univ. Toulouse 3* (November)
- **Kolloquium on probability theory** *Berlin, Germany* (May)