

Josué Corujo Rodríguez

Contact Information

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ArXiv arxiv.org/a/corujo_j_2.html

📖 scholar scholar.google.com/citations?user=3QdTmnoAAAAJ

Research Interests

Stochastic Processes: Markov processes, interacting particle systems, branching processes, long time convergence and mean-field limit, cutoff phenomenon

Quasi-stationary distributions : Moran (or Fleming – Viot) particle systems, convergence to the quasi-stationary distribution (QSD)

Population genetics : coalescent processes, structured populations

Random graphs : random graphs, multiplicative coalescent, random forests

Reliability theory : stochastic orders, aging classes, maintenance processes

Education

- 2018-2021 **Ph.D. in Mathematics.**
CEREMADE, Université Paris Dauphine, Paris, France
Title: *Multi-allelic Moran models and quasi stationary distributions*
Advisors: Djalil Chafaï (CEREMADE) and Simona Grusea (INSA-T)
- 2015-2017 **MSc in Mathematics – Probability and Statistics.**
Universidad de La Habana, Havana, Cuba
MSc Thesis: *Stochastic Comparisons between Two-Units Repairable Systems*
Advisor: José E. Valdés
- 2011-2015 **BSc in Mathematics.**
Universidad de La Habana, Havana, Cuba
BSc Thesis: *Analysis of Repairable Systems using Stochastic Orders and Aging Classes*
Advisor: José E. Valdés

Academic Appointments

- 2021– **Postdoc with Vlada Limic**
IRMA, Université de Strasbourg, Strasbourg, France

2018–2021	Graduate Teaching Assistant Génie Mathématique et Modélisation, INSA-T, Toulouse, France
2017–2018	Assistant Professor Universidad de La Habana, Havana, Cuba
2015–2017	Junior Professor Universidad de La Habana, Havana, Cuba

Articles and preprints

Preprints

- 2023 A. Arredondo, J. Corujo, C. Noûs, S. Boitard, L. Chikhi, O. Mazet, *Exact calculation of the expected SFS in structured populations*
 biorXiv: [10.1101/2023.05.10.540112](https://doi.org/10.1101/2023.05.10.540112)
- J. Corujo and V. Limic, *A dynamical approach to spanning and surplus edges of random graphs*
 arXiv: [2305.04716](https://arxiv.org/abs/2305.04716) | [HAL-04092273](https://hal.archives-ouvertes.fr/04092273)
- J. Corujo and V. Limic, *The standard augmented multiplicative coalescent revisited*
 arXiv: [2304.07545](https://arxiv.org/abs/2304.07545) | [HAL-04074235](https://hal.archives-ouvertes.fr/04074235)

Publications in peer reviewed journals

- 2023 J. Corujo, *On the spectrum and ergodicity of a neutral multi-allelic Moran model*
 ALEA **20** (2023), 505–546
 arXiv: [2010.08809](https://arxiv.org/abs/2010.08809) | [HAL-02969874](https://hal.archives-ouvertes.fr/02969874) | DOI: [10.30757/ALEA.v20-18](https://doi.org/10.30757/ALEA.v20-18)
- J. Corujo, D. Flores-Peñaloza, C. Huemer, P. Pérez-Lantero, and C. Seara, *Matching random colored points with rectangles*, J. Comb. Optim. **45**:81, (2023). ¹
 DOI: [10.1007/s10878-023-01010-z](https://doi.org/10.1007/s10878-023-01010-z)
- 2022 Cloez, B. and **Corujo, J.**
Uniform in time propagation of chaos for a Moran model
 Stochastic Process. Appl. **154** (2022) 251–285.
 arXiv: [2107.10794](https://arxiv.org/abs/2107.10794) | [HAL-03345583](https://hal.archives-ouvertes.fr/03345583) | DOI: [10.1016/j.spa.2022.09.006](https://doi.org/10.1016/j.spa.2022.09.006)
- 2021 **Corujo, J.**
Dynamics of a Fleming – Viot type particle system on the cycle graph
 Stochastic Process. Appl. **136** (2021), 57–91.
 arXiv: [2001.08000](https://arxiv.org/abs/2001.08000) | [HAL-02447747](https://hal.archives-ouvertes.fr/02447747) | DOI: [10.1016/j.spa.2021.02.001](https://doi.org/10.1016/j.spa.2021.02.001)
- Corujo, J.** and Valdés, J. E.
Further results on stochastic orderings and aging classes in systems with age replacement
 Probab. Eng. Inf. Sci. (2021), 1–30.
 HAL | DOI: [10.1017/S0269964821000036](https://doi.org/10.1017/S0269964821000036)

¹A preliminary version of this work appeared in WALCOM 2020, 14th International Conference and Workshop on Algorithms and Computation, Singapore.

- 2018 **Corujo, J.**, Valdés, J. E. and Laria, J. C.
Stochastic Comparisons of Two-Units Markovian Repairable Systems
Commun. Stat. - Theory Methods **48** (2019), no. 23, 5820–5838.
[arXiv: 1804.03098](#) | DOI: [10.1080/03610926.2018.1522349](#)
- Rodríguez, W., Mazet, O., Grusea, S., Arredondo, A., **Corujo, J.**, Boitard, S. and Chikhi, L.
The IICR and the non-stationary structured coalescent: towards demographic inference with arbitrary changes in population structure
Heredity **116** (2016), 362–371.
[HAL-02347366](#) | DOI: [10.1038/s41437-018-0148-0](#)

Publications in peer reviewed conferences

- 2020 **Corujo, J.**, Flores-Peñaloza, D., Huemer, C., Pérez-Lantero, P. and Seara, C.
Matching Random Colored Points with Rectangles, In: Rahman M., Sadakane K., Sung WK. (eds) **WALCOM: Algorithms and Computation**. **WALCOM 2020**. Lecture Notes in Computer Science, vol 12049. Springer, Cham.
[DOI:10/gzm6](#)

Scientific Communications

- June 2023 Invited speaker for the session *Quasi-stationary distributions in numerical stochastic methods and statistics* in the **21st INFORMS Applied Probability Society Conference, IECL**, Nancy, France
Talk: *Convergence of the empirical measure induced by a Moran type particle system*
- April 2023 Seminar **Mathématiques pour la Biologie**, Institut de Mathématiques de Toulouse, France.
Talk: *Large population limits for a mutation-selection Moran model*
- Oct. 2022 **Séminaire de Probabilités y Statistique, IECL**, Nancy, France
Talk: *A dynamical approach to spanning and surplus edges of random graphs*
- Oct. 2022 **ITI IRMIA++ Day**, Strasbourg, France
Talk: *Some recent advances in the multiplicative coalescent and near-critical random graphs*
- Oct. 2022 **Journées Math Bio Santé 2022**, Besançon, France
Poster: *IICR of structured populations with size change: strong and weak migration*
- May 2022 **Summer School Mathematics of Large Networks**, Budapest, Hungary
- April 2022 **Recent progress in probabilistic modelling of population genetics**
Royal Statistical Society, UK
Talk: *Spectrum and ergodicity of a neutral multi-allelic Moran model*
- April 2022 **Séminaire (de calcul) stochastique de Strasbourg**, Strasbourg
Présentation orale : *A neutral multi-allelic Moran model: spectral elements and cutoff*
- Mar. 2022 **Worskshop ANR QuAMProcs**, Inria Paris, France

	Talk: <i>Speed of convergence to the mean-field limit for a mutation-selection particle system</i>
Dec. 2021	GDR MAMОВI 2021, École polytechnique, France Talk: <i>Propagation of chaos for a multi-allelic Moran model</i>
Jun. 2021	Seminario de Probabilità, Analisi Stocastica e Statistica, Università di Pisa, Italy Talk: <i>Spectrum and ergodicity of a neutral Moran model</i>
Feb. 2021	Journée de doctorants en Probabilités, Institut de Mathématiques de Toulouse, France Talk: <i>Spectrum of the neutral Moran model and its long time behaviour</i>
Dec. 2020	Séminaire de Probabilité, Institut de Mathématiques de Toulouse, France Talk: <i>On the spectrum of a neutral multi-allelic Moran model.</i>
Nov. 2020	Séminaire de Probabilité et Statistique, Montpellier, France Talk: <i>Spectral properties of a neutral multi-allelic Moran model</i>
Mar. 2020	14th International Conference on Operations Research, Havana, Cuba Talk: <i>Convergence of a Fleming–Viot type particle system on the cycle graph.</i>
Feb. 2020	Séminaire “Mathématiques pour la Biologie”, Institut de Mathématiques de Toulouse, France Talk: <i>On a multi-allelic Moran type model with mutation matrix corresponding to a cycle graph</i>
Feb. 2020	Research school “EDP et probabilité pour la biologie” CIRM, Marseille, France Poster: <i>Quantitative results on a multi-allelic Moran type model with mutation</i>
Dec. 2019	Workshop on Models and Inference in Population Genetics, Warwick, UK. Poster: <i>Quantitative results on a multi-allelic Moran type model with mutation</i>
Nov. 2019	Journée des doctorant.e.s et post-doc, Institut de Mathématiques de Toulouse, France Talk: <i>Quantitative results on a multi-allelic Moran type model with mutation</i>
Sep. 2019	GDR MAMОВI 2019, Université de Tours, France Talk: <i>Quantitative results for a Moran type particle process in the cycle graph</i>
Sep. 2019	Journée de rentrée, INSA de Toulouse, France Talk: <i>Quantitative results for a Fleming-Viot type particle process in the cycle graph</i>
Jul. 2019	Summer school “Data and Models in Ecology and Evolution”, Institut Pascal, Université Paris-Saclay, France Talk: <i>Quantitative results for a Moran type particle process in the cycle graph</i>
Feb. 2019	Master Course from Cooperation project in Mathematics France – Cuba (lectures by Miraine Dávila Felipe) Universidad de La Habana, Cuba Title : “Stochastic processes applied to Biology”
Jul. 2017	10th International Conference on Mathematical Methods in Reliability, Grenoble, France

Talk: *Stochastic Comparisons of Two-Units Markovian Repairable Systems*

Honor and Awards

2022	<i><u>Prix solennels de thèse</u></i> , from <i>La Chancellerie des Universités de Paris</i>
2021	<i>Postdoctoral Fellowship</i> funded the Labex IRMIA, Strasbourg, France
2015	<i>Scientific Merit Award</i> from the Rector of the Universidad de La Habana
2015	<i>Graduated Summa Cum Laude in Mathematics</i> from Universidad de La Habana

Computational Skills

MATLAB, , Python , Wolfram Mathematica, Maple , \LaTeX , **git**

Languages

Spanish	Native Language
English	Professional Proficiency
French	Professional Proficiency