

Verónica Miró Pina

www.normalesup.org/~miropina

Born in Murcia (Spain), February 18th 1991
✉ veronica.miro@crg.eu

Current position

2020 - ... **Postdoc**, *Weghorn's lab*, Centre for Genomic Regulation, Barcelona (Spain).

Research Interests

Cancer genomics, Population genetics, Evolutionary biology.

Deep Learning, Neural Networks.

Statistical inference, Data-analysis, Simulations.

Probability theory, Stochastic processes, Coalescent theory.

Previous positions

2018 - 2020 **Postdoc**, *Instituto de Investigaciones en Matemáticas Avanzadas y Sistemas (IIMAS)*, Universidad Nacional Autónoma de México (UNAM).

Education

2015 - 2018 **PhD**, *Equilibrium patterns of genetic diversity shuffled by migration and recombination*, LPSM (Sorbonne Université) and CIRB (Collège de France), Advisors : Emmanuel Schertzer and Amaury Lambert.

2013-2014 **Masters (2nd year)**, *Applied Mathematics*, Université Pierre et Marie Curie, Paris 6, with honors.

2012-2013 **Master (1st year)**, *Biology*, École Normale supérieure (Paris).

2011-2012 **Bachelors Degree**, *Biology*, École Normale supérieure (Paris).

Publications

Published papers

2022 **Segregational instability of multicopy plasmids: A population genetics approach**, Hernandez, J.C.R.* , Miró Pina, V.* , Siri-Jégousse, A., Peña Miller, R., Palau, S. and González Casanova, A., *PLoS ONE*, 12(12), e9469.

* both should be considered first authors

2022 **The role of connectivity on COVID-19 preventive approaches**, Miró Pina*, V., Nava-Trejo*, J. Tobiás, A., Nzabarushimana, E., González Casanova, A. and González Casanova, I., *PLoS ONE*, 17(9): e0273906.

* both should be considered first authors

2022 **The symmetric coalescent and Wright-Fisher models with bottlenecks**, González Casanova, A., Miró Pina, V. and Siri-Jégousse, A., *Annals of Applied Probability*, 32(1), 235–268.

† authors listed in alphabetical order

2022 **Estimating the time since admixture from phased and unphased molecular data**, Janzen, T., Miró Pina, V., *Molecular Ecology Resources*, 22(3), 908–926.

2021 **Chromosome Painting**, Lambert, A., Miró Pina, V. and Schertzer, E., *Annals of Applied Probability*, 31(2), 826–864.

† authors listed in alphabetical order

2020 **The Wright-Fisher model with efficiency**, González Casanova, A., Miró Pina, V. and Pardo, J.C., *Theoretical Population Biology*, 132, 33–46.

2019 **How does geographic distance translates into genetic distance?**, Miró Pina, V and Schertzer, E., *Stochastic processes and their Applications*, 129(10) 3839-3921 7.

† authors listed in alphabetical order

Preprints

- 2023 **An extension of the Walsh-Hadamard transform to calculate and model epistasis in genetic landscapes of arbitrary shape and complexity**, *Faure, A.J., Lehner, B., Miró Pina, V., Serrano Colomé, C. and Weghorn, D.*, bioRxiv 2023.03.06.531391, under revision.
† authors listed in alphabetical order
- 2022 **The stochastic speed of coming down from infinity for general Dirichlet Xi-coalescents**, *González Casanova, A., Miró Pina, V., Schertzer, E. and Siri-Jégousse, A.*, aRxiv 2209.13438, under revision.
† authors listed in alphabetical order

Grants and fellowships

- 2022-2023 **Agaur LLavor (2021 LLAV 00061)**, *Project grant for innovative projects with the potential for being incorporated into the production sector, from the Catalan Agency for Management of University and Research Grants*, project: TAFI (Tumor Allele Frequency Interpreter) : a Deep Learning tool to reveal tumor heterogeneity.
- 2018-2022 **Postdoctoral fellowship**, *DGAPA-UNAM (Universidad Nacional Autónoma de México)*.
- 2015-2018 **PhD scholarship**, *PhD scholarship for students from École Normale Supérieure*.

Research Experience

- May-July 2015 **Laboratoire de Biométrie et Biologie Évolutive**, *University Lyon 1 (Lyon, France)*, Nicolas Lartillot, Study of an individual-based model of species diversification. Statistical inference, MCMC algorithms
- January-April 2015 **Department of Ecology and Evolutionary Biology, Princeton University**, *Simon Levin's Lab*, Theoretical ecology, Study of the speciation mechanisms.
- February 2014 **SMILE team (Stochastic Models for the Inference of Life and Evolution)**, *CIRB, Collège de France*, Emmanuel Scherter and Amaury Lambert, Study of a population-based model of speciation.
- February -June 2013 **Center for Genomics and Systems Biology, NYU, New York University**, Edo Kussell
Experimental evolution.
- June-July 2012 **Centro Nacional de Biotecnología, CSIC, Universidad Autónoma de Madrid (Spain)**, Juan Poyatos
Experimental study of a genetic network in E.coli.

Teaching experience

- 2022 Supervisor. Larisa Arreola's undergraduate tesis, UNAM.
- 2020 Supervisor. Fernanda López Eslava's undergraduate , UNAM.
- 2020 Supervisor. Amilkar Gazque's undergraduate student, UNAM.
- 2019 Teacher. Probability 2 and Applied mathematics seminar. Undergrad level at UNAM
- 2015-2018 Teaching assistant at Ecole Normale Supérieure (Paris): Mathematics for biologist. Master's level
- 2015-2018 Teaching assistant at Université Pierre et Marie Curie (Paris): Probability, Differential equations, Analysis. Undergrad level.
- 2012-2015 Oral examiner at lycée Henri IV (Paris, France). Undergrad level

Selected Presentations

- 2022 TAFI (Tumor Allele Frequency Interpreter): a new deep learning tool to reveal the evolutionary history of tumors. Contributed talk, Probgén 2022, Oxford
- 2022 TAFI (Tumor Allele Frequency Interpreter): a new deep learning tool to reveal the evolutionary history of tumors. Poster, WE-Heraeus-Seminar / Evolution of Cancer - Reconstructing the Past, Predicting the Future
- 2021 Estimating the time since admixture from phased and unphased molecular data. Poster SMBE 2021 - Society for Molecular Biology and Evolution
- 2021 Ξ -coalescents arising from population models with bottlenecks. Journées MAS, Institut Denis Poisson, Orléans, France.
- 2021 Ξ -coalescents arising from population models with bottlenecks. Probability seminar, University of Bath, UK (online).
- 2020 The symmetric coalescent. Bernoulli-IMS One World Symposium 2020. Available on YouTube.
- 2019 The symmetric coalescent. Invited talk. CLAPEM 2019, Merida, Yucatan, Mexico

- 2019 A population genetics model to understand plasmid loss and maintenance, segundo taller nacional de Probabilidad y Biología, Cuernavaca
- 2019 The symmetric coalescent. Invited talk. SPA 2019, Chicago, US
- 2019 The symmetric coalescent. MMEE 2019, Lyon, France
- 2019 The symmetric coalescent. Invited talk. Congreso de la Sociedad Matemática Mexicana, Monterrey, México.
- 2019 Spatial models in Population Genetics. Workshop Ecosystem dynamics: stakes, data and models, Institut Pascal, Saclay, France
- 2018 Chromosome Painting. Primer taller nacional de Probabilidad y Biología, Cuernavaca.
- 2018 Chromosome Painting. Saint Flour Probability School France).
- 2017 Chromosome Painting. AIEM - SBE meeting (regional meeting of the Society for Molecular Biology and Evolution). Lyon (France).
- 2017 How does geographic distance translates into genetic distance? Annual meeting of the French research group 'Theory and Models of Biodiversity' Paris (France).
- 2017 Chromosome Painting. 'Les Probabilités de demain' (young researchers in Probability meeting), IHES (France).
- 2017 How does geographic distance translates into genetic distance? Conference MMEE (Mathematical Models in Ecology and Evolution), London (UK).
- 2016 Chromosome Painting (poster) Conference MCEB (Mathematical and Computational Evolutionary Biology), Montpellier (France).
- 2016 How does geographic distance translates into genetic distance? ECMTB (European Conference on Mathematical and Theoretical Biology), Nottingham (UK).

Other skills

- Computer science Python, R, bash (advanced), C++, Matlab (basics)
- Languages Bilingual in Spanish and French. Fluent in English. Basic knowledge of Catalán
- Organisation 2021-2022. Postdoc representative: member of the CRG postdoc committee, organisation of career related and social events.
2015-2016. Student representative: organisation of cultural and social events for the students and postdocs at Collège de France.
2011-2012. Student representative: organisation of social events and of the annual gala at Ecole Normale Supérieure.