

Dr. Alexis SIMON

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EDUCATION

PhD student: Evolutionary and Biodiversity Sciences **09/2016 – 12/2019**

*Supervised by Nicolas Bierne – Institut des Sciences de l'Évolution de Montpellier (ISEM, France)
& John Welch – Department of Genetics, University of Cambridge (UK)*

Defended the 12/12/2019 at the University of Montpellier

Dissertation: Genomics of anthropogenic hybridization in *Mytilus* spp. mussels and hybrid fitness.

Master's degree: Ecology, Biodiversity & Evolution (EBE) **09/2013 – 07/2016**

École Normale Supérieure (ENS, Paris, France) and Université Paris VI (Paris, France)

The ENS is a higher education institution providing specialized training by and for research.

Bachelor's degree: Life Sciences **09/2012 – 07/2013**

ENS (Paris, France)

Classe préparatoire BCPST **09/2010 – 06/2012**

Caen, France

RESEARCH EXPERIENCE

Postdoctoral researcher **11/2024 – present**

Supervised by Thomas Broquet & Denis Roze – Roscoff Biological Station, Sorbonne University (France)

Detecting local adaptation using Ancestral Recombination Graphs. Application to the detection of local adaptation to ports in the tunicate *Botryllus schlosseri*.

Postdoctoral researcher **07/2021 – 10/2024**

Supervised by Graham Coop – University of California, Davis (USA)

Estimating the contribution of admixture, selection, and genetic drift to allele frequency change in time series genomic data. Method development, simulation, and use of human ancient DNA datasets for analyses.

Postdoctoral researcher **02/2020 – 05/2021**

Supervised by Nicolas Bierne – ISEM (France)

Molecular evolution of a transmissible cancer in the *Mytilus* species complex.

- Genome assembly and annotation using long-reads technology
- Bioinformatics for high-coverage and contaminated samples: custom manipulation of variant calls, mutation spectra, copy-number variation

PhD student **09/2016 – 12/2019**

Supervised by Nicolas Bierne – ISEM (France) & John Welch – Dpt of Genetics, Uni. Cambridge (UK)

Population genetics and genomics, bioinformatics, field and lab work, theoretical developments.

- Research intern, M.Sc. year 2** **02/2016 – 07/2016**
Supervised by Nicolas Bierne – ISEM (France)
 Biological invasion with hybridization in the *Mytilus edulis* species complex: genetic data analysis and modeling.
- Research intern (gap year)** **02/2015 – 07/2015**
Supervised by David Claessen and Boris Sauterey – Biological Institute of the ENS, Eco-evolutionary Mathematics Team (Paris, France)
 Implementation of a trait diffusion model of phyto-zooplankton co-evolution in a 1D version of the MIT general circulation model.
- Research intern (gap year)** **09/2014 – 01/2015**
Supervised by Claudia Junge and Bronwyn Gillanders – Marine Ecology Laboratory, Adelaide University (Australia)
 Population genetics of two shark species, *Carcharhinus obscurus* and *Carcharhinus brachyurus*.
- Research intern, M.Sc. year 1** **02/2014 – 07/2014**
Supervised by Ingrid Richter and Andrew Fidler – Cawthron Institute (Nelson, New Zealand)
 Detecting environmental petroleum pollutants and associated chemicals using tunicate xenobiotic receptors as sensor elements in modified yeast strains.
- Research intern, B.Sc.** **06/2013 – 07/2013**
Supervised by Pierrick Barbier and Tarik Meziane – National Museum of Natural History (Paris, France)
 Recruitment variability of Bivalvia in the *Glycymeris glycymeris* habitat in the archipelago of Chausey (France).

TEACHING AND SUPERVISION

- Supervision of Antonella P. Barreiro, PhD student, research visit** **04/2021 – 06/2021**
University of Vigo
 Comparative genomics of protein families implicated in reproduction and immunity in *Mytilus* species. Orthologs finding and annotation, gene family evolution and domain analysis.
- Co-supervision of a 2nd year M.Sc. student, Agnès Duhamet** **02/2020 – 06/2020**
University of Montpellier (France)
 Evolutionary history and introgression heterogeneity in a speciation continuum of partially isolated mussels *Mytilus* spp.
- Co-supervision of a 2nd year M.Sc. student, Maurine Hammel** **02/2018 – 06/2018**
University of Montpellier (France)
 Junior Research Team grant: Evolutionary genetics and genomics of a transmissible cancer in the *Mytilus edulis* species complex.
- Teaching assistant – tutorials for statistics in ecology** **15 hours, 2018**
University of Montpellier (France)
 TD at the L2 level, HLMA408, Mathematics Dpt: descriptive statistics, estimations and tests, confidence intervals, linear regression.

OTHER TRAINING

Academic Lab Management & Leadership Symposium 2023
Torrey Pines Training Consortium
Lab management and leadership, communication and conflict resolution, mentoring, recruitment, diversity and inclusion.

GRANTS

Sorbonne University MSCA Seal of Excellence postdoctoral fellowship: 170k€ 2024
Sorbonne University
Awarded after obtaining a score of 97.8% at the European postdoctoral MSCA evaluation.

Junior Research Team, Labex CEMEB: 5000€ 2018
University of Montpellier (France)
Local funding for a PhD student to form a junior research team with an M.Sc. student to work on an unexplored topic of the PhD research.

PhD funding, 3 years salary 2016
ENS Paris

PUBLICATIONS

Peer-reviewed:

1. **Simon, A.**, & Coop, G. (2024). The Contribution of Gene Flow, Selection, and Genetic Drift to Five Thousand Years of Human Allele Frequency Change. *PNAS*, 121(9), e2312377121. <https://doi.org/10.1073/pnas.2312377121>
2. Hammel, M., Touchard, F., Burioli, E. A. V., Paradis, L., Cerqueira, F., Chailier, E., Bernard, I., Cochet, H., **Simon, A.**, Thomas, F., Destoumieux-Garzón, D., Charrière, G. M., & Bierne, N. (2024). Marine Transmissible Cancer Navigates Urbanised Waters, Threatening to Spillover. *Proceedings of the Royal Society B: Biological Sciences*, 291(2017), 20232541. <https://doi.org/10.1098/rspb.2023.2541>
3. Nascimento-Schulze, J. C., Bean, T. P., Peñaloza, C., Paris, J. R., Whiting, J. R., **Simon, A.**, Fraser, B. A., Houston, R. D., Bierne, N., & Ellis, R. P. (2023). SNP Discovery and Genetic Structure in Blue Mussel Species Using Low Coverage Sequencing and a Medium Density 60K SNP-array. *Evolutionary Applications*, 16(5), 1044–1060. <https://doi.org/10.1111/eva.13552>
4. Hammel, M., **Simon, A.**, Arbiol, C., Villalba, A., Burioli, E. A. V., Pépin, J.-F., Lamy, J.-B., Benabdelmouna, A., Bernard, I., Houssin, M., Charrière, G. M., Destoumieux-Garzon, D., Welch, J. J., Metzger, M. J., & Bierne, N. (2022). Prevalence and Polymorphism of a Mussel Transmissible Cancer in Europe. *Molecular Ecology*, 31(3), 736–751. <https://doi.org/10.1111/mec.16052>
5. Touchard*, F., **Simon*, A.**, Bierne, N., & Viard, F. (2023). Urban Rendezvous along the Seashore: Ports as Darwinian Field Labs for Studying Marine Evolution in the Anthropocene. *Evolutionary Applications*, 16(2), 560–579. *Co-first authors. <https://doi.org/10.1111/eva.13443>
6. Fraisse, C., Popovic, I., Romiguier, J., Loire, E., **Simon, A.**, Galtier, N., Duret, L., Bierne, N., Vekemans, X., & Roux, C. (2021). DILS : Demographic Inferences with Linked Selection by Using ABC. *Molecular Ecology Resources*, 21, 2629–2644. <https://doi.org/10.1111/1755-0998.13323>

7. Pastor, A., Larsen, J., Hansen, F. T., **Simon, A.**, Bierne, N., & Maar, M. (2021). Agent-Based Modeling and Genetics Reveal the Limfjorden, Denmark, as a Well-Connected System for Mussel Larvae. *Marine Ecology Progress Series*, 680, 193–205. <https://doi.org/10.3354/meps13559>
8. **Simon, A.**, Fraïsse, C., El Ayari, T., Liautard-Haag, C., Strelkov, P., Welch, J. J., & Bierne, N. (2021). How Do Species Barriers Decay? Concordance and Local Introgression in Mosaic Hybrid Zones of Mussels. *Journal of Evolutionary Biology*, 34, 208–223. <https://doi.org/10.1111/jeb.13709>
9. **Simon, A.**, Arbiol, C., Nielsen, E. E., Couteau, J., Sussarellu, R., Burgeot, T., Bernard, I., Coolen, J. W. P., Lamy, J., Robert, S., Skazina, M., Strelkov, P., Queiroga, H., Cancio, I., Welch, J. J., Viard, F., & Bierne, N. (2020). Replicated Anthropogenic Hybridisations Reveal Parallel Patterns of Admixture in Marine Mussels. *Evolutionary Applications*, 13(3), 575–599. <https://doi.org/10.1111/eva.12879>
10. Burioli, E., Trancart, S., **Simon, A.**, Bernard, I., Charles, M., Oden, E., Bierne, N., & Houssin, M. (2019). Implementation of Various Approaches to Study the Prevalence, Incidence and Progression of Disseminated Neoplasia in Mussel Stocks. *Journal of Invertebrate Pathology*, 168, 107271. <https://doi.org/10.1016/j.jip.2019.107271>
11. Junge, C., Donnellan, S. C., Huveneers, C., Bradshaw, C. J. A., **Simon, A.**, Drew, M., Duffy, C., Johnson, G., Cliff, G., Braccini, M., Cutmore, S. C., Butcher, P., McAuley, R., Peddemors, V., Rogers, P., & Gillanders, B. M. (2019). Comparative Population Genomics Confirms Little Population Structure in Two Commercially Targeted Carcharhinid Sharks. *Marine Biology*, 166(2). <https://doi.org/10.1007/s00227-018-3454-4>
12. Yonemitsu, M. A., Giersch, R. M., Polo-Prieto, M., Hammel, M., **Simon, A.**, Cremonte, F., Avilés, F. T., Merino-Véliz, N., Burioli, E. A. V., Muttray, A. F., Sherry, J., Reinisch, C., Baldwin, S. A., Goff, S. P., Houssin, M., Arriagada, G., Vásquez, N., Bierne, N., & Metzger, M. J. (2019). A Single Clonal Lineage of Transmissible Cancer Identified in Two Marine Mussel Species in South America and Europe. *Elife*, 8, e47788. <https://doi.org/10.7554/eLife.47788>
13. **Simon***, **A.**, & **Duranton***, **M.** (2018). Digest: Demographic Inferences Accounting for Selection at Linked Sites. *Evolution*, *Co-first authors. <https://doi.org/10.1111/evo.13504>
14. **Simon, A.**, Bierne, N., & Welch, J. J. (2018). Coadapted Genomes and Selection on Hybrids: Fisher's Geometric Model Explains a Variety of Empirical Patterns. *Evolution Letters*, 2(5), 472–498. <https://doi.org/10.1002/evl3.66>
15. Riquet, F., **Simon, A.**, & Bierne, N. (2017). Weird Genotypes? Don't Discard Them, Transmissible Cancer Could Be an Explanation. *Evolutionary Applications*, 10, 140–145. <https://doi.org/10.1111/eva.12439>

Preprints:

Simon, A. (2022). Three New Genome Assemblies of Blue Mussel Lineages: North and South European *Mytilus edulis* and Mediterranean *Mytilus galloprovincialis*. *Biorxiv*. <https://doi.org/10.1101/2022.09.02.506387>

INVITED PRESENTATIONS

Center for Population Biology seminar (University of California Davis, USA)	02/2022
Molly Schumer's lab seminar (Stanford University, USA)	11/2020
EvoLunch, IST seminar (Vienna, Austria)	06/2020

CONFERENCE COMMUNICATIONS

Bivalve Transmissible Neoplasia Workshop (Wildlife Cancer European Network) (talk)	2024
Advances in Marine Mussel Research (talks)	2016, 2017, 2024
Society of Molecular Biology and Evolution (SMBE) (talk)	2023
Society of Molecular Biology and Evolution (SMBE) (talk)	2023
GSA Population, Evolutionary, and Quantitative Genetics Conference (poster)	2022
Population Genetics Group Meeting, PopGroup (talk)	2021
Evolution, II Joint Congress on Evolutionary Biology (talk & poster)	2018
Marine Evolution (talk)	2018
Sfecologie - International Conference on Ecological Sciences (talk)	2018
French meeting of the GDR on biological invasions (talk)	2018
GDRi on Marine connectivity, iMarCo (talks)	2016, 2017, 2018
SMBE regional meeting, Interdisciplinary Approaches for Molecular Evolution (talk)	2017
Petit pois déridé, French meeting of population geneticists (talk)	2017
French GDR interdisciplinary approaches in evolution (poster)	2017
European Elasmobranch Association Conference (talk)	2015

COMMUNITY SERVICE

Creator and administrator of the ecoevo.social Mastodon server **02/11/2022 – present**

Administration of a Mastodon server dedicated to hosting the Ecology and Evolution community. Presently hosting around 5,200 registered users.

Reviewing: 23 reviews of 13 publications

Ecology and Evolution, eLife, Evolution, Evolutionary Applications, Genetics, Global and planetary change, ICES journal of marine science, Molecular Ecology, Molecular Ecology Resources, Peer Community in Genomics, PeerJ, PLOS Biology, PLOS Genetics

Conference co-organization: Advances in Marine Mussel Research (AMMR) **2017**
Sète, France