Àlex Giménez Romero

Researcher at the Institute for Cross-disciplinary Physics and Complex Systems (Spain)

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Employment

2022 – 2024 **Research Assistant,** Institute for Cross-disciplinary Physics and Complex Systems
Under the supervision of Manuel A. Matías.

2024 – 3 mo **Research Stay,** Oxford University
Under the supervision of Roberto Salguero-Gómez.

2023 – Nov. **Remote Research Stay,** University of Exeter
Under the supervision of Daniel P. Bebber.

2023 – May **Research Stay,** Institute of Physics of Cantabria
Under the supervision of Jose M. Gutiérrez.

2021 – 2022 **Research Assistant,** Institute for Cross-disciplinary Physics and Complex Systems
Competitive internal call from MdM program. Under the supervision of Manuel A. Matías.

2020 – 2021 **Research Assistant,** Institute for Cross-disciplinary Physics and Complex Systems
Under the supervision of Manuel A. Matías.

2019 – 2019 **Research Internship,** Institute of Material Science of Barcelona

Education

2021 – 2024 **PhD in Physics of Complex Systems,** University of the Balearic Islands
Thesis title: *Theoretical and data-driven models in Ecology*
Distinction "cum laude"

2021 – 2022 **M.Sc. Quantitative Finances,** UNED
Excellent in all modules.
Thesis title: *A robust analysis of mean-variance and higher moment portfolio optimization models*.

2019 – 2020 **M.Sc. Physics of Complex Systems,** University of the Balearic Islands
Excellent in 9/13 subjetcs.
Thesis title: *Modelling the Mass Mortality Event of Pinna nobilis*.

2015 – 2019 **B.Sc. Physics,** Autonomous University of Barcelona
Honors in numerical methods I and II
Thesis title: *Nanoscale Heat Transport Study by Monte Carlo Simulations*.

Research Publications

Preprints

1. **À. Giménez-Romero**, C. M. Duarte, and M. A. Matías, "A comprehensive dataset on global coral reefs size and geometry," *Submitted*, 2024.

2. **À. Giménez-Romero**, D. Ferchichi, P. Moreno-Spiegelberg, T. Sintes, and M. A. Matías, "Mapping the distribution of seagrass meadows from space with deep convolutional neural networks," *biorxiv*, 2024. DOI: 10.1101/2024.03.21.586047.

3. **À. Giménez-Romero**, E. Moralejo, and M. A. Matias, "High-resolution climate data reveals increased risk of pierce's disease for grapevines worldwide," *bioRxiv*, 2024. DOI: 10.1101/2024.03.06.583743.

4. E. Moralejo, J. A. García-Muñoz, S. Denman, and **À. Giménez-Romero**, "Leaf susceptibility of macaronesian laurel forest species to phytophthora ramorum," *bioRxiv*, 2023. DOI: 10.1101/2023.07.15.549153.

Journal Articles

1. **À. Giménez-Romero**, M. A. Matías, and C. M. Duarte, "Unravelling the universal spatial properties of coral reefs," *Global Ecology and Biogeography*, e13939, DOI: https://doi.org/10.1111/geb.13939.

2. **À. Giménez-Romero**, M. Iturbide, E. Moralejo, J. M. Gutiérrez, and M. A. Matías, "Global warming significantly increases the risk of pierce's disease epidemics in european vineyards," *Scientific Reports*, vol. 14, p. 9648, 2024. DOI: 10.1038/s41598-024-59947-y.

3. E. Moralejo, **À. Giménez-Romero**, and M. A. Matías, "Linking intercontinental biogeographic events to decipher how european vineyards escaped pierce's disease," *Proceedings of the Royal Society B: Biological Sciences*, vol. 291, p. 20 241 130, 2024. DOI: 10.1098/rspb.2024.1130.

4. **À. Giménez-Romero**, E. Moralejo, and M. A. Matías, "A compartmental model for xylella fastidiosa diseases with explicit vector seasonal dynamics," *Phytopathology®*, vol. 113, pp. 1686–1696, 2023. DOI: 10.1094/PHYTO-11-22-0428-V.

5. C. Lago, **À. Giménez-Romero**, M. Morente, M. A. Matías, A. Moreno, and A. Fereres, "Degree-day-based model to predict egg hatching of Philaenus spumarius (Hemiptera: Aphrophoridae), the main vector of Xylella fastidiosa in Europe," *Environmental Entomology*, vol. 52, pp. 350–359, 2023. DOI: 10.1093/ee/nvad013.

6. S. Flecha, **À. Giménez-Romero**, J. Tintoré, *et al.*, "Ph trends and seasonal cycle in the coastal balearic sea reconstructed through machine learning," *Scientific Reports*, vol. 12, p. 12 956, 2022. DOI: 10.1038/s41598-022-17253-5.

7. **A. Giménez-Romero**, J. Galván, M. Montesinos, *et al.*, "Global predictions for the risk of establishment of pierce's disease of grapevines," *Communications Biology*, vol. 5, p. 1389, 2022. DOI: 10.1038/s42003-022-04358-w.

8. **À. Giménez-Romero**, R. Flaquer-Galmés, and M. A. Matías, "Vector-borne diseases with nonstationary vector populations: The case of growing and decaying populations," *Phys. Rev. E*, vol. 106, p. 054 402, 5 2022. DOI: 10.1103/PhysRevE.106.054402.

9. **À. Giménez-Romero**, F. Vazquez, C. López, and M. A. Matías, "Spatial effects in parasite-induced marine diseases of immobile hosts," *Royal Society Open Science*, vol. 9, p. 212 023, 2022. DOI: 10.1098/rsos.212023.

10. **À. Giménez-Romero**, A. Grau, I. E. Hendriks, and M. A. Matias, "Modelling parasite-produced marine diseases: The case of the mass mortality event of pinna nobilis," *Ecological Modelling*, vol. 459, p. 109 705, 2021. DOI: https://doi.org/10.1016/j.ecolmodel.2021.109705.

Technical Reports

1. D. P. Bebber, S. J. Gurr, A. Karley, L. Lozada-Ellison, T. Beale, and À. Giménez-Romero, "Interdisciplinary analysis of plant health threats to scotland: Project final report," Scotland's Centre of Expertise for Plant Health (PHC), Tech. Rep., 2024. DOI: 10.5281/zenodo.11613888.

Presentations

Invited talks

2024
- **Minisymposium**. Korean Society for Mathematical Biology (KSMB), *Modeling the risk of vector-borne plant diseases in a changing climate*.
- **Minisymposium**. Dynamical Systems Applied to Biology and Natural Sciences (DSABNS), *Modelling Xylella fastidiosa diseases: transmission dynamics, global spatiotemporal risk predictions and design of control strategies*.

Contributed talks

- **Annual Meeting of the British Ecological Society**. ACC Liverpool, *Population structure is key to community stability*.
- **FisEs Joven**. Online, *Population structure plays a key role in ecosystem stability*.
- **Conference on Complex Systems**. University of Exeter, *Universal spatial properties of coral reefs*.
- **Climate-Inclusive Ecosystem Modelling: Understanding the Dynamics of Ecosystems in a Changing World (ECM satellite)**. Centre de Recerca Matemàtica (CRM), *A climate-driven epidemiological model for Xylella fastidiosa diseases*.

2023
- **Conferencia Internacional sobre Xylella fastidiosa**. Consejo Superior de Investigaciones Científicas (CSIC), *Modeling Xf diseases: transmission dynamics, global spatiotemporal risk predictions and design of control strategies*.
- **FisEs Joven**. Online, *Vector-borne diseases with non-stationary vector populations*.

2022
- **Congreso de la Sociedad Española de Fitopatología**. Universidad Politécnica de Valencia (UPV), *Global Risk Predictions for Pierce's Disease of Grapevines*.
- **Conference on Complex Systems**. Institute for Cross-disciplinary Physics and Complex Systems (IFISC), *Global Risk Predictions for Pierce's Disease of Grapevines*.
- **International Symposium of Plant Virus Epidemiology**. Instituto de Ciencias Agrarias (ICA), *Global Risk Predictions for Pierce's Disease of Grapevines*.

2021
- **3rd European conference on Xylella fastidiosa**. European Food Safe Authority (EFSA) *Risk of establishment of Pierce's disease in main wine-producer regions worldwide*.

Seminars

2023
- **Las Mañanas IFCA**. Instituto de Física de Cantabria (IFCA), *A climate-driven epidemiological model for Pierce's disease of grapevines*.

2022
- **Applied Math Seminar**. Utah State University (USU), *Modelling Parasite-Produced Marine Diseases: spatial vs non-spatial models*.

Research projects

2022 – 2025
- CYCLE (*Complex DYnamics of CoastaL Ecosystems: Resilience to Climate Change*). Institute for Cross-disciplinary Physics and Complex Systems (IFISC). **PI**: Tomàs Sintes, Damià Gomila and Iris Hendriks.

2022 – 2024
- SEDIMENT (*SEagrass DIversity in the MEditerranean basin in a global change scenario: a machine learNing approach from saTellite images*). Institute for Cross-disciplinary Physics and Complex Systems (IFISC). **PI**: Tomàs Sintes and Manuel Matías.

2019 – 2022
- SuMaEco (*Sustainability of marine coastal ecosystems in the context of global change in the Mediterranean Sea*). Institute for Cross-disciplinary Physics and Complex Systems (IFISC). **PI**: Damià Gomila, Tomàs Sintes and Núria Marbà.

Funding

2024
- **Research stay** – IMOVE CSIC. 4.500€
  Grant to perform a 3 month stay at Oxford University under the supervision of Rob Salguero-Gómez.
- **Research stay** – Ayudas CEP-EDUIB-Santander. 4.000€
  Grant to perform a 3 month stay at Oxford University under the supervision of Rob Salguero-Gómez. (*Declined*)

Press releases

2024
- *Un estudio revela patrones espaciales universales en corales de todo el mundo* – *La Vanguardia, yahoo!noticias,*
- *The absence of an epidemic in grapes* – In Other Journals (Science)
- *El cambio climático potencia la bacteria que devora olivos en el Mediterráneo* – CSIC, ABC, RTVE, El Periódico, La Sexta, 20 minutos, EuropaPress, Última Hora, Diario de Mallorca...
- *El 'ébola del olivo' podría llevar casi una década en Mallorca* – Última Hora.
- *Capítol 555* – IB3 Mèteo.
- *La intel·ligència artificial, una eina al servei de la posidònia* – IB3 Notícies.

2023
- *Una nueva herramienta permite predecir la eclosión de las ninfas del insecto que transmite la Xylella* – SER Ibiza, IB3 Ràdio.

2022
- *Un equipo del CSIC identifica la tendencia de acidificación del Mar Balear a través de inteligencia artificial* – CSIC, La Vanguardia, 20minutos, COPE, EuropaPress, Última Hora, Diario de Mallorca, Ara Balears.
- *El IFISC desarrolla un modelo para entender las epidemias marinas* – Última Hora.

Teaching

2023 – 2024
- **Complex Systems Modelling in Economics** – University of the Balearic Islands
  M.Sc. in Physics of Complex Systems. *Lecturer: Dr. Pere Colet & Dr. Rosa López*
- **Econophysics** – University of the Balearic Islands
  4th year of B.Sc. in Physics. *Lecturer: Dr. Pere Colet & Dr. Rosa López*

2022 – 2023
- **Econophysics** – University of the Balearic Islands
  4th year of B.Sc. in Physics. *Lecturer: Dr. Rosa López*

Thesis Supervision

2023 –
- **M.Sc. Thesis** – University of the Balearic Islands – Elena del Campo
  Monitoring the resilience of seagrass meadows from satellite imagery using machine learning. *co-supervised with Dr. Manuel A. Matías*

2022 – 2023
- **M.Sc. Thesis** – University of the Balearic Islands – Mustapha Bousakla
  Age of infection disease modeling: from Kermack and McKendrick to multi-compartment models. *co-supervised with Dr. Manuel A. Matías*

2020 – 2021
- **M.Sc. Thesis** – University of the Balearic Islands – Rosa Flaquer
  A compartmental model for vector transmitted diseases: an application to Xylella fastidiosa. *co-supervised with Dr. Manuel A. Matías*

Mentoring

2024 **Cientific@s en prácticas** – Institute for Cross-disciplinary Physics and Complex Systems.
Descifrando el fondo marino desde el espacio.

2023 **SURF fellowship** – Institute for Cross-disciplinary Physics and Complex Systems
Compartmental models and their application to study phytopathologies. *co-supervised with Dr. Manuel A. Matías*

2022 **SURF fellowship** – Institute for Cross-disciplinary Physics and Complex Systems
Analysis of biodiversity in Posidonia meadows with satellite images through machine learning. *co-supervised with Dr. Manuel A. Matías*

Outreach

Articles

2024 **The Conversation** (Medioambiente + Energia). *Cómo los viñedos europeos escaparon de una devastadora enfermedad… por ahora*

The Conversation (Medioambiente + Energia). *"Xylella fastidiosa" y el cambio climático amenazan la viticultura europea: hemos calculado cuánto*

2023 **The Conversation** (Ciencia + Tecnologia). *Descifrando el fondo marino desde el espacio con los ojos de la inteligencia artificial*

Science & Wine (Blog). *Pierce's disease of grapevines caused by Xylella fastidiosa: what are the risks?*

Events

2024 **Pint of Science** (IFISC, UIB). *Descifrando el fondo marino desde el espacio*

2023 **IV Scientific Dissemination Contest** (UIB). *Desxifrant el fons marí des de l'espai amb els ulls de la intel·ligència artificial*

Ciència a tot Tren (CSIC). *Desxifrant el fons marí des de l'espai amb els ulls de la intel·ligència artificial*

Academic service

Peer-review

2024 **Julia Conference**.

2023 **PLoS Computational Biology**.

2022 **Conservation Biology**.

Ecological Modelling.

Other

2023 11F initiative collaborator since the 2023/24 edition

Honors & awards

2024 **Finalist of the IV Scientific Dissemination Contest of the UIB**.

2023 **Winner of the Circular Innovation Hackathon** (Sampol).

2022 **Winner of the Circular Innovation Hackathon** (Senda Ecoway).

Top 5 poster competition EFSA.

Skills

Languages	English, Spanish, Catalan.
Coding	Python, Julia, R, C++, bash, LaTeX, …
Databases	MySQL, PostgreSQL,SQLite.
Web Dev	Dash, jekyll, HTML, Markdown.
V. Control	GIT
Geo data	GEOjson, shapefile, geotiff
Climate data	netCDF, GRIB
Tabular and other data	CSV, Excel, JSON

Miscellaneous Experience

Developed webpages

- **CAMELE dashboard** – https://camele.ifisc.uib-csic.es/
- ***Philaenus spumarius* egg hatching prediction** – https://pseggs.ifisc.uib-csic.es/
- **Pierce's disease risk dashboard** – https://pdrisk.ifisc.uib-csic.es/
- **Personal webpage** – https://agimenezromero.github.io

Certifications

2023 **Ecology: Ecosystem Dynamics and Conservation** – American Museum of Natural History.

2021 **Natural Language Processing Specialisation** – DeepLearning.AI.
4 courses: *Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning; Convolutional Neural Networks in TensorFlow; Natural Language Processing in TensorFlow; Sequences, Time Series and Prediction*

Tensorflow Developer – DeepLearning.AI.
4 courses: *Natural Language Processing with Classification and Vector Spaces; Natural Language Processing with Probabilistic Models; Natural Language Processing with Sequence Models; Natural Language Processing with Attention Models*

2020 **Scalable Machine Learning on Big Data using Apache Spark** – IBM.

Machine Learning with Python – IBM.

The Data Science Course 2020: Complete Data Science Bootcamp – Udemy.

2019 **Fundamentals of Data Visualisation in Tableau** – Udemy.