

1. TRAINING CAPACITY

1.1. Planned training program in the context of the project

We are seeking for a PhD candidate with a degree in Biochemistry, Biology or Biotechnology. Candidates with degrees in other related biosciences would be considered. A Master in related fields would be also required (*e.g.*, Molecular Biology and Biomedicine, Plant Molecular Biology and Biotechnology, Virology, Integrative Evolutionary Biology, Integrative Synthetic Biology, Bioinformatics, Biostatistics...). The student will follow a PhD program of his/her choice, always related to the topic of the thesis, among the several offered by the Universitat de València or the Universitat Politècnica de València. The PhD student will acquire a solid multidisciplinary training in Molecular Virology, Evolutionary Genetics, Systems Biology, and Bioinformatics. Depending on the candidate's background, we will devote more or less effort in training him/her in:

1. A large array of molecular virology techniques and classical virology techniques.
2. Planning and executing large-scale experiments with plants and worms. Handling of infected and noninfected organisms.
3. Handling of virus samples in biosafety conditions.
4. Sampling techniques and preservation of different types of samples.
5. Data collection and preparation.
6. Good laboratory practices, including the proper use of e-lab notebooks.
7. Preparation of samples for Illumina HTS and Sanger sequencing.
8. Acquire proficiency in Illumina HTS data quality assessment and curation, organization, and assembly.
9. Advanced statistical methods using R (and/or SPSS).
10. Python or R programming.
11. Theoretical concepts of evolutionary genetics, including population data analyses.
12. Basic concepts of networks biology and systems biology.
13. Elaboration of scientific manuscripts.

During the first year, the student will get familiar with all the molecular techniques and manipulation of biological materials. In parallel, s/he will be guided to acquire the fundamental concepts of virus evolution by reading the key literature in the field and acquire Python or R programming skills. In addition, s/he will be involved in tasks related with Aims 1, 2 and 3.

During the second year, the student will complete tasks in Aims 1, 2 and 3 and start the evolution experiments of Aims 2 and 4.

During the third year, the student will complete the experimental work associated to Aims 2 and 4, refresh and/or learn statistical methods required and will begin analyzing the data generated.

For the last year, the student will collaborate in the elaboration of manuscripts (drafting a first version), will prepare posters for national and international congresses and last, but not least, will prepare a PhD dissertation, which will be defended by the end of this year.

In addition, as part of her/his formation, the student will be required to participate in our weekly lab and department meetings and in the I²SysBio seminar series and in any other seminar of interest scheduled by other institutions in the València metropolitan area.

The student will also apply to the EMBO-YIP PhD Program, which takes place every year at Heidelberg. It is one-week long and covers topics generally not considered by more classical PhD programs such as the editorial process, paper review, ethics of research, presentation skills, laboratory management, communication and divulgation, and efficient preparation of grant proposals.

1.2. List of PhD thesis completed or in progress in the last 10 years and ongoing

1. Nicolas Tromas. 13/3/7. Evaluating fundamental life-history traits for tobacco etch potyvirus. UV. Qualification: Excellent *Cum Laude*.

2. Guillaume C.G. Lafforgue. 13/5/12. Resistance to virus infection mediated by artificial microRNAs: estimating the likelihood of escape mutants. UV. Qualification: Excellent *Cum Laude*.
3. Fernando Martínez. 14/1/24. Análisis de la dinámica de replicación de un virus de RNA de plantas y del uso de microRNAs artificiales como estrategia antiviral. UPV. Qualification: Excellent *Cum Laude* and doctorate special prize.
4. Julia Hillung. 15/9/5. La emergencia viral como consecuencia de la interacción entre las variabilidades genéticas del virus y huésped. UV. Qualification: Excellent *Cum Laude*.
5. Anouk Willemsen. 16/5/24. Experimental evolution of genome architecture and complexity in an RNA virus. UV. Qualification: Excellent *Cum Laude* and doctorate special prize.
6. Héctor Cervera. 18/1/26. Epistasia multidimensional y rugosidad de los paisajes adaptativos y factores del huésped que determinan la eficacia viral. UPV. Qualification: Excellent *Cum Laude*.
7. Anel Nurtay. 19/2/25. Mathematical modelling of pathogen specialization. Universitat Autònoma Barcelona. Qualification: Excellent *Cum Laude*.
8. Rebeca Navarro. 21/3/26. Evolución de virus en huéspedes con susceptibilidad variable: consecuencias en eficacia y virulencia. UV. Qualification: Excellent.
9. Anamarija Butković. 21/10/13. Application of genome-wide association studies (GWAS) to identify host targets of viral adaptation. UV. Qualification: Excellent *Cum Laude*.
10. Ruben González. 21/11/9. Virus adaptation at different levels. Study on the evolutionary effects of mutations, host population genetic structure and environmental factors in potyviruses. UPV. Qualification: Excellent *Cum Laude*.
11. M^a José Olmo. UV. In progress.
12. Izan Melero. UV. In progress.
13. Juan C. Muñoz. UV. In progress.
14. Ivair J. de Moraes. Universidade de Brasília (Brazil). In progress.
15. Esmeralda García. UV. In progress.

1.3. Scientific career of past group members (only those holding senior positions mentioned)

1. PhD supervisor. [Patricia Agudelo-Romero](#), group leader Telethon Kids Institute, Perth (Australia).
2. Postdoc mentor. [Stéphanie Bedhomme](#), HDR CNRS-Centre d'Ecologie Fonctionnelle et Evolutive. Montpellier (France). Winner of an ERC-CoG.
3. Postdoc mentor. [Guillermo P. Bernet](#), agrogenomics coordinator Sistemas Genómicos SL, València.
4. Postdoc mentor. [Alexandra Blanchard](#), scientific director ADM-Pancosma, Geneve (Switzerland).
5. PhD supervisor. [Javier Carrera](#), data scientist Genetech Corp., San Francisco CA (USA).
6. PhD supervisor. [Francisco M. Codoñer](#), CEO ScaleUP Bio Ltd., Singapore (Singapore).
7. PhD supervisor and postdoc mentor. [José M. Cuevas](#), associate professor I²SysBio-UV.
8. Postdoc mentor. [Beata Hasiów-Jaroszewska](#), professor NRI Plant Protection, Poznań (Poland).
9. Postdoc mentor. [Denis Kutnjak](#), associate scientist National Institute of Biology, Ljubljana (Slovenia).
10. PhD supervisor. [Guillaume C.G. Lafforgue](#), CR1 INRAE-Virologie Végétale, Bourdeaux (France).
11. PhD supervisor. Jasna Lalić, R+D projects manager Sandoz-Novartis Development Center, Ljubljana (Slovenia).
12. PhD supervisor. [Guillermo Rodrigo](#), associate professor I²SysBio-CSIC.
13. PhD supervisor and postdoc mentor. [Rafael Sanjuán](#), associate professor I²SysBio-UV. Winner of ERC-StG, ERC-CoG and ERC-AdG.
14. Postdoc mentor. [Josep Sardanyès](#), Ramón y Cajal researcher CRM, Barcelona.
15. PhD supervisor. [Clara Torres-Barceló](#), CR1 INRAE-Pathologie Vegetal, Avignon (France).

16. PhD supervisor. [Nicolas Tromas](#), DR1 INRAE-*Alpine Center for Research on Trophic Networks and Limnic Ecosystems*, Thonon Les Bains (France).
17. Postdoc mentor. [Paul E. Turner](#), professor Yale University, New Haven CT (USA). AAAS and NAS member.
18. PhD supervisor. [Anouk Willemsen](#), assistant professor Universität Wien, Vienna (Austria). Winner of an ERC-StG.
19. Postdoc mentor. [Beilei Wu](#), associate professor CAAS-Institute of Plant Protection, Beijing (China).
20. Postdoc mentor. [Mark P. Zwart](#), KNW associate professor NIOO, Wageningen (Netherlands).