

## UNIVERSITÀ DEGLI STUDI DI MILANO

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## Stéphanie SHERPA

### CURRICULUM VITAE

## INFORMAZIONI PERSONALI

COGNOME	SHERPA
NOME	STEPHANIE
DATA DI NASCITA	13/10/1992

## TITOLI

## TITOLO DI STUDIO

2016 - 2019	PhD in Biodiversity, Ecology and Environment, completed on 03/12/2019 University Grenoble Alpes, Grenoble, France Dissertation: Colonization history and factors promoting the success of invading populations of the Asian tiger mosquito <i>Aedes albopictus</i> in Europe
2013 - 2015	Master of Science in Biodiversity, Ecology and Evolution, completed on 17/06/2015. Upper second-class honors University of Rennes 1, Rennes, France Dissertation: Morphometric variation in island populations of the land snail <i>Cornu aspersum</i> : role of natural selection and historical constraints
2010 - 2013	Bachelor of Science in Biology, completed on 24/06/2013. Lower second-class honors University Blaise Pascal Clermont-Ferrand II, Clermont-Ferrand, France

## CONTRATTI DI RICERCA, ASSEGNI DI RICERCA O EQUIVALENTI

01/09/2021 - present	Postdoctoral fellow (Assegnista di ricerca tipo B), Department of Environmental Science and Policy, University of Milan, Milan, Italy
01/01/2021 - 31/03/2021	Postdoctoral fellow, Alpine Ecology Laboratory (LECA 5553), French National Centre for Scientific Research (CNRS), Grenoble, France
01/09/2019 - 31/12/2020	Research and Teaching fellow (ATER), Alpine Ecology Laboratory (LECA 5553), University Grenoble Alpes, Grenoble, France
01/10/2016 - 31/08/2019	Doctoral fellow, Alpine Ecology Laboratory (LECA 5553), University Grenoble Alpes, Grenoble, France

## ATTIVITÀ DIDATTICA A LIVELLO UNIVERSITARIO IN ITALIA O ALL'ESTERO

### Assistant lecturer (course holder; corresponds to “professore a contratto”)

2020 - 2021:

- Course in Population genetics, Teaching unit: Ecology and Evolution, 1<sup>st</sup> year of Master in Biodiversity, Ecology and Evolution, University Grenoble Alpes, France (French), 25 hours
- Course in Scientific communication, 2<sup>nd</sup> year of Master in Master in Biodiversity, Ecology and Evolution, University Grenoble Alpes, France (French), 25 hours

2019 - 2020:

- Course in Population genetics, Teaching unit: Ecology and Evolution, 1<sup>st</sup> year of Master in Biodiversity, Ecology and Evolution, University Grenoble Alpes, France (French), 43.5 hours
- Course in Scientific communication, 2<sup>nd</sup> year of Master in Master in Biodiversity, Ecology and Evolution, University Grenoble Alpes, France (French), 25 hours
- Course in Population genetics, Teaching unit: Genetics, 2<sup>nd</sup> year of Bachelor in Biology/Life and Earth Sciences, University Grenoble Alpes, France (French and English), 21.75 hours
- Course in Animal Biology and Evolution, Teaching unit: Organisms biology, 1<sup>st</sup> year of Bachelor in Life Sciences, University Grenoble Alpes, France (French), 51 hours

### Teaching assistant (tutorials/practicals)

2022 - 2023:

- Teaching unit: Approaches to the Study of Ecological Systems, 1<sup>st</sup> year of Master in Environmental Change and Global Sustainability, University of Milan, Italy (English), 24 hours (crash courses)

2020 - 2021:

- Population genetics, Teaching unit: Genetics, 2<sup>nd</sup> year of Bachelor in Biology/Life and Earth Sciences, University Grenoble Alpes, France (French), 15 hours

2019 - 2020:

- Ecology, Teaching unit: Ecology, 2<sup>nd</sup> year of Bachelor in Biology/Life and Earth Sciences, University Grenoble Alpes, France (French), 45 hours
- Landscape genetics, Teaching unit: Biodiversity conservation, 1<sup>st</sup> year of Master in Biodiversity, Ecology and Evolution, University Grenoble Alpes, France (French), 3 hours

2018 - 2019:

- Population genetics, Teaching unit: Ecology and Evolution, 1<sup>st</sup> year of Master in Biodiversity, Ecology and Evolution, University Grenoble Alpes, France (French), 19 hours
- Landscape genetics, Teaching unit: Biodiversity conservation, 1<sup>st</sup> year of Master in Biodiversity, Ecology and Evolution, University Grenoble Alpes, France (French), 3 hours

2017 - 2018:

- Population genetics, Teaching unit: Ecology and Evolution, 1<sup>st</sup> year of Master in Biodiversity, Ecology and Evolution, University Grenoble Alpes, France (French), 22 hours
- Ecology, Teaching unit: Ecology, 2<sup>nd</sup> year of Bachelor in Biology/Life and Earth Sciences, University Grenoble Alpes, France (French), 24 hours
- Population genetics, Teaching unit: Biodiversity and Evolution, 3<sup>rd</sup> year of Bachelor in Biology, University Grenoble Alpes, France (French), 18 hours

2016 - 2017:

- Population genetics, Teaching unit: Ecology and Evolution, 1<sup>st</sup> year of Master in Biodiversity, Ecology and Evolution, University Grenoble Alpes, France (French), 22 hours
- Ecology, Teaching unit: Ecology, 2<sup>nd</sup> year of Bachelor in Biology/Life and Earth Sciences, University Grenoble Alpes, France (French), 27 hours
- Population dynamics and population genetics, Teaching unit: Biodiversity and Evolution, 3<sup>rd</sup> year of Bachelor in Biology, University Grenoble Alpes, France (French), 21 hours

**DOCUMENTATA ATTIVITÀ DI FORMAZIONE O DI RICERCA PRESSO QUALIFICATI ISTITUTI ITALIANI O STRANIERI**

**Research activities:**

My research focuses on the mechanisms shaping the genetic composition and geographic distribution of animal populations, and how the evolution of these population parameters relates to historical biogeographic processes, species evolutionary history, and more recent processes in the context of global changes. My research incorporates common garden experiments, ecological niche modelling, demographic inference, and landscape genomics using modern high-throughput sequencing technology.

My main research interests are centered on the eco-evolutionary mechanisms of biological invasions. This includes understanding biogeography, and evolutionary processes, such as the role of Pleistocene land connections and recent human-aided introductions on current distributions across Mediterranean islands and continents in snails and lizards, and the contribution of species' ecological niche, migration history, stochastic processes, and post-introduction response to new selective environments in mosquito invasions. I have also collaborated on several projects evaluating the role of past climatic changes and recent habitat fragmentation on the demographic dynamics of endangered butterfly populations at range margins.

Until recently, niche conservatism (pre-existing adapted traits before introduction) and niche shifts (rapid trait changes after introduction) were often evaluated without considering migration history and intraspecific variation. In my research I emphasize the reconstruction of colonization histories and assess whether distinct evolutionary solutions along environmental gradients in species with wide native geographic distributions can promote global-scale invasions. To do so, I am using genomic predictive tools to reconstruct theoretical invasion pathways and I validate these by comparing predicted and sampled invasion histories across different environments.

Environmental DNA is being increasingly used to track invasive species beyond their native range, but can also provide knowledge on biological interactions. This would complete the environmental predictors used for habitat suitability evaluation and adaptation studies to better assess the short-term evolutionary changes during species invasions. The development of predictive models integrating population genomic and metagenomic data represents the future challenge in invasion science. This will allow a quantitative estimation of the adaptive potential of invasive populations, which together with expansion rates are required to accurately predict future distribution ranges and spread risks.

**Training activities:**

**Co-supervision of PhD students:**

2021 - present Martina Muraro. PhD in Environmental Sciences, University of Milan, Italy

**Supervision/co-supervision of Master students:**

2021 - 2022 Viola Di Canio. Master in Biodiversity and Evolution, University of Milan, Italy. Dissertation: Genetic consequences of an artificial introduction of the Italian Wall Lizard, *Podarcis siculus*, to a new island

2019 - 2020 Tiphaine Bacot. Master in Biodiversity, Ecology and Evolution, University Grenoble Alpes, France. Dissertation: Ecological and evolutionary processes driving phenotypic variation in invasive insects - *Aedes albopictus* as a case study

**Supervision of Bachelor students:**

2019 - 2020 Iljana Tosi. Bachelor in Biology, University Grenoble Alpes, France. Dissertation: Designing an experimental protocol to study the cold tolerance of *Aedes albopictus* eggs from temperate and tropical regions

## REALIZZAZIONE DI ATTIVITÀ PROGETTUALE

### Coordination of funded research projects:

2019 - 2021: Predicting the invasive phenotypes of the Asian tiger mosquito  
Position held: Principal investigator; Funds: LECA-CNRS-UGA, Grenoble, France; Activities: study design; coordination of and participation to sampling, experimental work, and data analysis; valorization (publication, communication)

### Participation to funded research projects:

2020 - 2023: HYBRIND, Global change, hybridization, and the tyranny of the golden mean  
Principal investigator: Prof. Gentile Francesco Ficetola (University of Milan); Position held: Postdoctoral fellow; Funds: PRIN 2017 - MUR; Activities: coordination of and participation to sampling, experimental work, and data analysis; valorization (publication, communication)

2018 - 2019: Genetic structure and landscape connectivity of *Parnassius apollo*  
Principal investigator: Prof. Laurence Després (University Grenoble Alpes); Position held: Collaborator; Funds: Parcs naturels régionaux (PNR) Chartreuse, Bauges, Vercors, and Volcans d'Auvergne; Activities: participation to data analysis and valorization (publication)

2018 - 2019: Genetic diversity and population structure of *Coenonympha hero*  
Principal investigator: Prof. Laurence Després (University Grenoble Alpes); Position held: Collaborator; Funds: CNRS-CBNFC-ORI 181388, Réserve naturelle nationale du lac de Remoray, PNR Haut-Jura; Activities: participation to data analysis and valorization (publication)

2017 - 2019: ALBODIF, Invasion dynamics of the Asian tiger mosquito in Europe  
Principal investigator: Prof. Laurence Després (University Grenoble Alpes); Position held: Doctoral fellow; Funds: Labex OSUG@2020 (ANR10 LABX56); Activities: study design; coordination of sampling, experimental work and data analysis; valorization (publication, communication)

2016 - 2020: ZIKAlliance, A global alliance for Zika virus control and prevention  
Principal investigator: Dr. Jean-Philippe David (CNRS); Position held: Collaborator; Funds: European Union's Horizon 2020 Research and Innovation Programme (Grant 734548); Activities: participation to data analysis and valorization (publication)

## ORGANIZZAZIONE, DIREZIONE E COORDINAMENTO DI GRUPPI DI RICERCA NAZIONALI E INTERNAZIONALI, O PARTECIPAZIONE AGLI STESSI

### Coordinator of an international research network on the genomics of the Asian tiger mosquito

I participated to the initiation of an international network of researchers, all working on *Aedes albopictus*, involving several academic and non-academic institutions of research, as well as public institutions. To face the need for more informative molecular markers and integrative studies at large spatial scales in *A. albopictus*, I developed and coordinated the international network on “*Aedes albopictus* invasion genetics” and I wrote or participated to the writing of several grant proposals (LECA-CNRS-UGA 2019 internal call; Labex OSUG@2020 (ANR10 LABX56); OSUG@2020 (ANR10 LABX56)-A07-bis), all of which have been funded. These funded projects allowed us to develop a modern high-throughput sequencing technics (ddRADseq) in this species and to produce genomic data for more than 200 worldwide populations and more than 1000 individual mosquitoes, which currently represents the most comprehensive genomic database for *A. albopictus*. I have been fully involved in the design and the decision-making process of several studies, whose scientific productions include seven publications and eight communications in national and international conferences.

Participants: University Grenoble Alpes (France); Southern Medical University (China); Universiti Sains Malaysia (Malaysia); Institut Pasteur du Cambodge (Cambodia); Centre for Research in Infectious Diseases (Cameroon); Emory University (USA); Istituto Zooprofilattico Sperimentale delle Venezie (Italy); Symbiosis Technologies for Insect Control (France); National Institute of Infectious Diseases (Japan); Kasetsart University (Thailand); Ewha Womans University (South Korea); Institut Pasteur du Laos (Laos); Entente interdépartementale pour la démostication (France); Recep Tayyip Erdogan University (Turkey); Hacettepe University (Turkey); Centre de Recerca en Sanitat Animal (Spain); Consell Comarcal del Baix Llobregat (Spain); Office de l'environnement de la Corse (France); Centro Agricoltura Ambiente “G.Nicoli” (Italy); Scuola Universitaria Professionale della Svizzera Italiana (Switzerland); Istituto Zooprofilattico Sperimentale della Sardegna “G. Pegreffi” (Italy); University of Primorska (Slovenia); University of Montenegro (Montenegro); University of Novi Sad (Serbia); Università “Kore” di Enna (Italy); Josip Juraj Strossmayer University (Croatia); Institute of Public Health (Albania)

### Participation to a national research network on the genomics of the Italian wall lizard

My role in this national network is to apply my expertise to the design of genetic studies, and the acquisition and analysis of genome-wide population genomic data, as part of the HYBRIND project (PRIN 2017 - MUR), as well as the transfer of my knowledge to collaborating researchers of the network and the transfer of my skills to PhD and Master students for future development of the host institution.

Participants: University of Milan (Italy); University of Pavia (Italy); University of L'Aquila (Italy); Roma Tre University (Italy)

### Participation to national research networks (GdR) on bioinformatics and evolutionary genomics

GdRs are research groups of the French National Centre for Scientific Research (CNRS) that federate the French scientific community developing work around an emerging original theme. GdRs organize annual meetings to foster the dialog between researchers, post-docs and students from a large number of French research institutes. I participate to meetings of the research groups dedicated to the field of bioinformatics and evolutionary genomics, which aim to present/discuss about recent statistical advances, applications and prospects to address fundamental questions in evolutionary biology.

Participation: joint annual meeting of the GdR AIEM (“Interdisciplinary Approach on Molecular Evolution”) and the working group ALPHY (“ALignments and PHYlogeny”) of the GdR BIM (“Bioinformatics for Molecular Biology”) in 2022 (March 14-16, Rennes, France); ALPHY annual meeting in 2019 (January 7-8, Paris, France); GdR GE (“Environmental Genomics”) meeting in 2018 (October 22, Rennes, France)

### Society memberships:

2019 - present	European Society for Evolutionary Biology (ESEB)
2019 - present	Society for the Study of Evolution (SSE)
2019 - 2021	French Society for Ecology and Evolution (SFE <sup>2</sup> )

## ATTIVITÀ DI RELATORE A CONGRESSI E CONVEGNI NAZIONALI E INTERNAZIONALI

### International conferences:

ESEB 2022 Congress - European Society for Evolutionary Biology, August 14-19, Prague, Czech Republic  
**Sherpa S.**, Salvi D., Silva-Rocha I., Paris J.R., Carretero M.A., Ficetola G.F. Population genomics reconstruct complex histories of colonization across archipelagos by lizards (Talk, English)

ESEB 2019 Congress - European Society for Evolutionary Biology, August 19-24, Turku, Finland  
**Sherpa S.**, Blum M.G.B., Després L. Invasion success of the Asian tiger mosquito in Europe: pre-adaptation, post-introduction evolution, or both? (Talk, English)

Sfécologie 2018 - International Conference on Ecological Sciences, October 22-25, Rennes, France  
**Sherpa S.**, Blum M.G.B., Després L. Genetic reconstruction of *Aedes albopictus* invasion history in Europe (Talk, English)

EVOLUTION 2018 - 2nd Joint Congress on Evolutionary Biology, August 19-22, Montpellier, France  
**Sherpa S.**, Rioux D., Goindin D., Fouque F., François O., Després L. Human impacts on population demographic history and genetic variation of the dengue vector *Aedes aegypti* in the Caribbean (Poster, English)

VIIIth EMCA Conference 2017, March 12-16, Bečići, Montenegro  
**Sherpa S.**, Rioux D., Després L. Massive parallel sequencing to infer the history and identify factors favouring the expansion of the tiger mosquito in Europe (Poster, English)

### National conferences:

Petit Pois Dérivé 2019, June 4-6, Gif-sur-Yvette, France  
**Sherpa S.**, Blum M.G.B., Després L. Neutral and adaptive processes during the European range expansion of the Asian tiger mosquito (Talk, French)

Petit Pois Dérivé 2017, June 6-9, Gif-sur-Yvette, France  
**Sherpa S.**, Ansart A., Madec L., Martin M.C., Dréano S., Guiller A. The biogeographic history of the land snail *Cornu aspersum aspersum* in the Mediterranean basin: natural spatial expansion versus anthropic dispersal (Talk, French)

### Research group meetings:

SSMPG 2022 workshop, September 19-23, Aussois, France  
**Sherpa S.**, Guéguen M., Renaud J., Tutagata J., Gaude T., Laporte F., Kamgang B., Vazquez-Prokopec G.M., Montarsi F., Cattell J., David J.-P., Thuiller W., Després L. When do climatic adaptations occur during global invasions? Comparing predicted and sampled invasion histories (Poster, English)

AIEM/ALPHY joint meeting 2022, March 14-16, Rennes, France  
**Sherpa S.**, Guéguen M., Renaud J., Tutagata J., Gaude T., Laporte F., Kasai J., Ishak I.H., Guo X., Shin J., Boyer S., Marcombe S., Chareonviriyaphap T., David J.-P., Chen X.-G., Zhou X., Després L. Can we predict the genetic and phenotypic traits of invasive populations of the Asian tiger mosquito? (Talk, English)

SSMPG 2017 workshop, September 11-15, Aussois, France  
**Sherpa S.**, Blum M.G.B., Després L. Colonization history and environmental factors favouring the expansion of the Asian tiger mosquito *Aedes albopictus* in Europe (Poster, English)

## CONSEGUIMENTO DI PREMI E RICONOSCIMENTI NAZIONALI E INTERNAZIONALI PER ATTIVITÀ DI RICERCA

### Awards:

- 2020 Academic thesis award - This award recognizes the scientific excellence of the research carried out by PhD students in research units of the University Grenoble Alpes. The University Grenoble Alpes has honored nine doctors, previously selected by the 13 doctoral schools of the University Grenoble Alpes, who graduated in 2019. URL: <https://doctorat.univ-grenoble-alpes.fr/doctoral-college/phd-news/2020-thesis-award-9-recent-phd-graduates-honored-by-uga-801786.kjsp>
- 2017 Best student poster award - VIIIth EMCA (Mosquito Control in a Changing Environment) Conference 2017, 12-16 March 2017, Bečići, Montenegro

### Scientific expertise:

- 2021 French qualification for the position of University Lecturer awarded by the National Universities Council (CNU): Field: CNU 67 - Population biology and ecology. This qualification establishes the quality of the scientific expertise and ability to carry out the functions of teacher-researcher

Referring activity for international scientific journals: Evolution, Evolutionary Applications, Molecular Ecology, BMC Genomics, Biological Invasions, Ecology and Evolution, BMC Biology, Evolutionary Ecology

## PRODUZIONE SCIENTIFICA

### PUBBLICAZIONI SCIENTIFICHE

#### Indicators of quality in scientific production (Scopus):

Number of publications: 13 (first author: 10, corresponding author: 9)

Number of citations: 152

h-index: 8

#### Refereed journal publications (reverse chronological order):

\*: Corresponding author

Journal's IF: 2021-2022 journal's impact factor

- [13] Muraro M., Sherpa S.\*, Barzaghi B., Bombi P., Borgatti D., Di Canio V., ... & Ficetola G.F. (2022). Condition- and context-dependent variation of sexual dimorphism across lizard populations at different spatial scales. *Scientific Reports*, In press.  
DOI: <https://doi.org/10.1038/s41598-022-21358-2>; Journal's IF: 4.379
- [12] Sherpa S.\*, Tutagata J., Gaude T., Laporte F., Kasai S., Ishak I.H., ... & Després L. (2022). Genomic shifts, phenotypic clines, and fitness costs associated with cold tolerance in the Asian tiger mosquito. *Molecular Biology and Evolution*, 39(5), msac104.  
DOI: <https://doi.org/10.1093/molbev/msac104>; Journal's IF: 16.24
- [11] Kebaïli C., Sherpa S., Rioux D., & Després, L. (2022). Demographic inferences and climatic niche modelling shed light on the evolutionary history of the emblematic cold-adapted Apollo butterfly at regional scale. *Molecular Ecology*, 31(2), 448-466.  
DOI: <https://doi.org/10.1111/mec.16244>; Journal's IF: 6.185
- [10] Sherpa S.\*, Kebaïli C., Rioux D., Guéguen M., Renaud J., & Després L. (2022). Population decline at distribution margins: assessing extinction risk in the last glacial relictual but still functional metapopulation of a European butterfly. *Diversity and Distributions*, 28(2), 271-290.  
DOI: <https://doi.org/10.1111/ddi.13460>; Journal's IF: 5.139

- [9] Sherpa S.\*, & Després L. (2021). The evolutionary dynamics of biological invasions: a multi-approach perspective. *Evolutionary Applications*, 14(6), 1463-1484.  
DOI: <https://doi.org/10.1111/eva.13215>; Journal's IF: 5.183
- [8] Sherpa S.\*, Renaud J., Guéguen M., Besnard G., Mouyon L., Rey D., & Després L. (2020). Landscape does matter: disentangling founder effects from natural and human-aided post-introduction dispersal during an ongoing biological invasion. *Journal of Animal Ecology*, 89(9): 2027-2042.  
DOI: <https://doi.org/10.1111/1365-2656.13284>; Journal's IF: 5.091
- [7] Cattel J., Faucon F., Lepéron B., Sherpa S., Monchal M., Grillet L., ... & David J.-P. (2020). Combining genetic crosses and pool targeted DNA-seq for untangling genomic variations associated with resistance to multiple insecticides in the dengue vector *Aedes aegypti*. *Evolutionary Applications*, 13(2): 303-317.  
DOI: <https://doi.org/10.1111/eva.12867>; Journal's IF: 5.183
- [6] Sherpa S.\*, Guéguen M., Renaud J., Blum M.G.B., Gaude T., Laporte F., ... & Després L. (2019). Predicting the success of an invader: Niche shift versus niche conservatism. *Ecology and Evolution*, 9(22): 12658-12675.  
DOI: <https://doi.org/10.1002/ece3.5734>; Journal's IF: 2.912
- [5] Sherpa S.\*, Blum M.G.B., & Després L. (2019). Cold adaptation in the Asian tiger mosquito's native range precedes its invasion success in temperate regions. *Evolution*, 73(9): 1793-1808.  
DOI: <https://doi.org/10.1111/evo.13801>; Journal's IF: 3.694
- [4] Sherpa S.\*, Blum M.G.B., Capblancq T., Cumer T., Rioux D., & Després L. (2019). Unraveling the invasion history of the Asian tiger mosquito in Europe. *Molecular Ecology*, 28(9): 2360-2377.  
DOI: <https://doi.org/10.1111/mec.15071>; Journal's IF: 6.185
- [3] Sherpa S., Rioux D., Pougnet-Lagarde C., & Després L. (2018). Genetic diversity and distribution differ between long-established and recently introduced populations in the invasive mosquito *Aedes albopictus*. *Infection, Genetics and Evolution*, 58: 145-156.  
DOI: <https://doi.org/10.1016/j.meegid.2017.12.018>; Journal's IF: 3.342
- [2] Sherpa S., Rioux D., Goindin D., Fouque F., François O., & Després L. (2018). At the origin of a worldwide invasion: unraveling the genetic makeup of the Caribbean bridgehead populations of the dengue vector *Aedes aegypti*. *Genome Biology and Evolution*, 10(1): 56-71.  
DOI: <https://doi.org/10.1093/gbe/evx267>; Journal's IF: 3.416
- [1] Sherpa S.\*, Ansart A., Madec L., Martin M.-C., Dréano S., & Guiller A. (2018). Refining the biogeographical scenario of the land snail *Cornu aspersum aspersum*: natural spatial expansion and human-mediated dispersal in the Mediterranean basin. *Molecular Phylogenetics and Evolution*, 120: 218-232.  
DOI: <https://doi.org/10.1016/j.ympev.2017.12.018>; Journal's IF: 4.286

Data

04/10/2022

Luogo

Milano