TO MAGNIFICO RETTORE OF UNIVERSITA' DEGLI STUDI DI MILANO

I the undersigned asks to participate in the public selection, for qualifications and examinations, for the awarding of a type B post-doc fellowship – **Cod ID: 5030**

Stéphanie Sherpa

CURRICULUM VITAE

PERSONAL INFORMATION

Surname	Sherpa
Name	Stéphanie
Date of birth	10/13/1992

PRESENT OCCUPATION

Appointment	Structure
No employment	

EDUCATION AND TRAINING

Degree	**Course of studies**	**University**	**Year of achievement of the degree**
PhD	Biodiversity, Ecology and Environment	University Grenoble Alpes, Grenoble, France	2019
Master	Master of Science in Biodiversity, Ecology and Environment Specialization: Functional, Behavioral and Evolutionary Ecology	University of Rennes 1, Rennes, France	2015
Bachelor	Bachelor of Science in Biology Specialization: Organisms, Populations, and Ecosystems Biology	University Blaise Pascal Clermont-Ferrand II, Clermont-Ferrand, France	2013

FOREIGN LANGUAGES

Languages	Level of knowledge
French	Native
English	Full professional
Spanish	Limited working

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PREVIOUS POSITIONS, SCHOLARSHIPS, INTERNSHIPS

Year	Appointment/Structure
01/2021–03/2021	**Postdoctoral fellow (CNRS, French National Centre for Scientific Research)** Laboratory of Alpine Ecology (LECA), Grenoble, FR. Topic: Spatial distribution of neutral genetic diversity in threatened butterflies. Supervisor: Laurence Després (LECA, UGA)
09/2019–12/2020	**Research and Teaching Assistant (UGA, University Grenoble Alpes)** Laboratory of Alpine Ecology (LECA), Grenoble, FR. Topic: Preadaptation versus post-introduction adaptation during biological invasion. Supervisor: Laurence Després (LECA, UGA)
10/2016–08/2019	**Doctoral fellow (UGA, University Grenoble Alpes)** Laboratory of Alpine Ecology (LECA), Grenoble, FR. Topic: Colonization history and factors promoting the success of invading populations of the Asian tiger mosquito *Aedes albopictus* in Europe. Supervisors: Laurence Després (LECA, UGA), and Michael Blum (TIMC, UGA)
01/2015–06/2015	**MSc student (UR1, University of Rennes 1)** Laboratory of Ecosystems, Biodiversity, Evolution (ECOBIO), Rennes, FR. Topic: Phylogeographic history of the land snail *Cornu aspersum aspersum*. Supervisors: Armelle Ansart, Luc Madec, and Annie Guiller
04/2014–05/2014	**MSc student (UCBL, University Claude Bernard Lyon 1)** Sport Research and Innovation Center (CRIS, UCBL) and University des Antilles et de la Guyane (UAG), Guadeloupe, FR. Topic: Morphometric variation and impact on locomotor behavior in *Anolis marmoratus*. Supervisor: Pierre Legreneur (CRIS, UCBL), Jérôme Guerlotté (UAG)
11/2012–12/2012	**BSc student (UBP, University Blaise Pascal Clermont-Ferrand II)** Laboratory Microorganisms Genome and Environment (LMGE), Clermont-Ferrand, FR. Topic: Evaluating the genetic diversity of *Archaea* in sediments of the Lac Pavin. Supervisor: Anne-Catherine Lehours

AWARDS, GRANTS

Year	Description of award
2020	**Academic Thesis Award** – 1,500€ Awarded by the University Grenoble Alpes to doctors whose thesis work was judged to be of exceptional quality. Link to the article: https://leca.osug.fr/Prix-de-these-UGA-2020-Stephanie
2017	**International Training Grant** – 1,450€ Funding from Labex OSUG@2020 (ANR10 LABX56)–AO7-bis for participating in 1-week advanced courses in landscape genetics at Margam Discovery Center (Wales, United Kingdom)
2017	**Best student poster award** – 200€ VIII EMCA Conference, Montenegro

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RESEARCH ACTIVITY

I am an evolutionary ecologist with broad interests in phylogeography, population genetics, invasion biology and conservation biology. My aim is to bridge recent theoretical and technical advances in the fields of ecology and evolution to build a more integrative evolutionary science that can delineate the processes that shape biodiversity patterns at different spatial and temporal scales. I have studied these patterns in various organisms, from invertebrates to vertebrates (snails, mosquitoes, butterflies, lizards), but focused on ectothermic organisms (i.e. no internal physiological sources for the maintenance of body temperature). These organisms have to deal with strong selective pressures imposed by their environment that crucially affect their dispersal and geographic distribution and involve specific evolution of life history traits, making them particularly suitable for studying the respective impacts of ecological factors and population history in generating diversity. I assessed diverse questions in behavioral ecology, phylogeography and demographic history, morphological evolution, and genomics of adaptation.

I started my academic training by doing the population biology bachelor program of the University of Clermont-Ferrand, France, where I graduated in 2013, followed in 2015 by a Master degree in ecology and evolution at the University of Rennes, France. During my first year of Master, I did an internship at the University of the Antilles and Guyana (UAG, Pointe-à-Pitre), where I assessed the relationship between ecology and morphology in *Anolis marmoratus*, an endemic anole of Guadeloupe. During this internship, I characterized morphometric variation (weight, limb length, number of subdigital lamellae), habitat use (height and width of trees) and locomotor behavior (ethograms) of several populations during five weeks of fieldwork. This experience motivated me to learn more sophisticated morphometrics tools (e.g., geometric morphometrics), but also to specialise in genetics, which seemed critical to fully understand the processes that shaped inter and intra-specific morphological variation. Following this idea, I did my Master 2 internship at the Laboratory of Ecosystems, Biodiversity, Evolution (ECOBIO, Rennes). For this work, I used intraspecific comparative methods combining complementary information on genitalia, shell size/shape, mtDNA and microsatellite loci to refine the biogeographic scenario of the land snail *Cornu aspersum* in Mediterranean Europe and to assess the respective roles of population history and recent selective pressures on explaining morphological variation. At the end of this internship, I wrote my first research paper published in *Molecular Phylogenetics and Evolution*.

I was then awarded a PhD fellowship from the French Ministry of Research (EDCSV) to do my PhD thesis at the Laboratory of Alpine Ecology (LECA, Grenoble) to work on the invasion history of the Asian tiger mosquito, *Aedes albopictus*, in Europe (ALBODIF project, L Després). My PhD was co-supervised by L Després (LECA) and M Blum (TIMC). I acquired various experimental skills (common garden experiments, wing morphometrics), lab work skills (DNA extraction, double-digested RADseq experiment) and analytical skills (bio-informatics, population genetics, demographic inferences, landscape genomics, ecological niche modelling) in order to distinguish the neutral and adaptive processes that shape the genetic variability of invasive populations. In parallel, I was also involved in a research project that looked for the genomic signatures of insecticide resistance in the mosquito *Aedes aegypti* (ZIKAlliance project, JP David). After my PhD defense in December 2019, I worked at LECA as a research and teaching assistant (ATER UGA) and then as a CDD researcher (CNRS) until March 2021. During this postdoc, I was in charge of my own research project (funded by a LECA internal grant) and I worked on the role of pre-adaptation in the invasive success of the tiger mosquito. We characterized the link between phenotypic (size, fitness, cold resistance), climatic and genetic (ddRADseq, exon capture) variation using different native populations, and predicted the phenotypes of various invasive populations based on the climate of the invaded areas. I also participated in two research projects on the impact of past climatic fluctuations and habitat fragmentation on the demographic history of butterfly populations, the Apollo *Parnassius apollo* and the Scarce Heath, *Coenonympha hero* (projects funded by managers of regional parks and nature reserves).

My PhD and postdoctoral researches are rooted in invasion biology (invasion success of the tiger mosquito) and conservation biology (demographic history of threatened butterflies); I therefore have a good knowledge of the recent literature in these scientific fields. By the nature of my previous projects, I have developed many skills that will be critical to complete the proposed project (e.g., population genetics, demographic inferences, landscape genomics, spatial analyses, ecological modelling). Moreover, having worked on NGS data during my PhD and my postdoc (ddRADseq, exon capture), I am now very comfortable with lab work and the bioinformatics treatment of large genomic data. Finally, my

previous research projects reflect my intention to extend classical distribution models to evolutionary studies. For example, I combined habitat suitability maps, species biology (dispersal capacity, generation time), and occupancy-detection time series to assess the role of natural versus passive dispersal during the expansion process of invasive populations (published in *Journal of Animal Ecology*) and used the knowledge of historical reports and population history inferred from genetic data to better assess the niche conservatism hypothesis during biological invasions (published in *Ecology and Evolution*).

In the future, I aim to position myself as an experienced researcher in an academic institution in my home country. In relation to this career perspective, it makes sense to me to develop my own research collaborative project and publish independently from my PhD supervisor to gain the required scientific maturity to become an independent researcher. Joining the Dipartimento di Scienze e Politiche Ambientali dell'Università degli Studi di Milano through this fellowship would mark a decisive step. My research is based on a collaborative work with academic and non-academic institutions and on the tranversal expertise of members in different research teams of my lab; I therefore plan in working collaboratively with the team members involved in the research project. During my research experiences, I have been fully involved in the study design and the decision-making process, I wrote several grant proposals, and I completed the existing resources and carried out the experiments, data analyses and valorization of the results. These experiences in management activity will allow me to lead a significant part of the research project. In terms of scientific production, my work have produced eight publications, six communications in national and international conferences, and my postdoc will lead to three additional articles, either submitted or in preparation. I also demonstrated my abilities to horizontally exchange my skills with students, lab members, and the general public, by introducing new courses in the Master program, supervising undergraduate and graduate students, and communicating on my research, including presentations during lab meetings and several events organized by LECA, UGA, or regional federation for research, and writing popular version of the main results. I thus believe I will make a significant contribution to the dynamics of the working group.

PROJECT ACTIVITY

Year	Project
2019–2020	Predicting the invasive phenotypes of the Asian tiger mosquito using climatic and phenotypic characteristics of native evolutionary lineages. Financed by the institution: LECA, CNRS, UGA (Grenoble, France), 10,000€. Researcher in charge: Dr. Stéphanie Sherpa. Position held: Principal investigator.
2018–2019	Genetic structure and landscape connectivity of *Parnassius apollo* in the French Alps and Auvergne. Financed by: Parc Natural Regional (PNR) Chartreuse, PNR Bauges, PNR Vercors, PNR Volcans d'Auvergne; 8,000€. Institution involved: LECA, CNRS, UGA (Grenoble, France); Researcher in charge: Prof. Laurence Després. Position held: Member of the research team.
2018–2019	Genetic diversity and population structure of *Coenonympha hero* in Franche Comté. Financed by: Conservatoire botanique national de Franche-Comté, Observatoire régional des Invertébrés, Réserve naturelle nationale du lac de Remoray, PNR Haut-Jura (CNRS-CBNFC-ORI no. 181388), 10,500€. Institution involved: LECA, CNRS, UGA (Grenoble, France). Researcher in charge: Laurence Després. Position held: Member of the research team.
2017–2019	Invasion dynamics of the Asian tiger mosquito in Europe (ALBODIF). Financed by: Labex OSUG@2020 (Investissements d'avenir—ANR10 LABX56), 14,000€. Institution involved: LECA, CNRS, UGA (Grenoble, France). Researcher in charge: Prof. Laurence Després. Position held: Member of the research team.
2017–2019	A global alliance for Zika virus control and prevention (ZIKAlliance). Financed by: European Union's Horizon 2020 Research and Innovation Programme (Grant Agreement 734548). Institution involved: LECA, CNRS, UGA (Grenoble, France); Pasteur Institute in French Guiana. Researcher in charge: Dr. Jean-Philippe David. Position held: Member of the research team.

CONGRESSES AND SEMINARS

Date	Title	Place
2019	Invasion success of the tiger mosquito in Europe: pre-adaptation, post-introduction evolution, or both?	**ESEB 2019 Congress** (Turku, Finland), oral presentation (English)
2019	Neutral and adaptive processes during the European range expansion of the Asian tiger mosquito	**Petit Pois Déridé 2019** (Gif-sur-Yvette, France), oral presentation (French)
2018	Colonization routes and demographic history of *Aedes albopictus* European populations	**Sfecologie 2018** (Rennes, France), oral presentation (English)
2018	Human impacts on population demographic history of *Aedes aegypti* in the Caribbean	**EVOLUTION 2018** (Montpellier, France), poster presentation (English)
2017	Colonization history and environmental factors favoring the expansion of *Aedes albopictus* in Europe	**SSMPG 2017 Summer School** (Aussois, France), poster presentation (English)
2017	The phylogeographic history of the land snail *Cornu aspersum* in the Mediterranean basin	**Petit Pois Déridé 2017** (Gif-sur-Yvette, France), oral presentation (French)
2017	Massive parallel sequencing to infer the invasion history of the tiger mosquito in Europe	**VIII EMCA Conference** (Bečići, Montenegro), poster presentation (English)

PUBLICATIONS

Indicators of Quality in Scientific Production	
Total number of citations	92 (Scopus), 138 (Google Scholar)
Mean number of citations/year	23 (since first publication), 35 (postdoctoral period) (Scopus)
h-index	7 (Scopus), 7 (Google Scholar)
i10-index	7 (Google Scholar)
Number of publications in the first quartile (Q1)	9 in the category "Ecology, Evolution, Behavior and Systematics" with SJR 2019 rank between 24/663 and 94/663

Articles in reviews
[10] **Sherpa S.,** Kebaïli C., Rioux D., Guéguen M., Renaud J., & Després L. Population decline at distribution margins: assessing extinction risk in the last glacial relictual but still functional metapopulation of a European butterfly. Submitted to *Diversity and Distributions*.
[9] **Sherpa S.,** & Després L. (2021). The evolutionary dynamics of biological invasions: a multi-approach perspective. *Evolutionary Applications*, In press (published online on 05.03.2021); DOI: 10.1111/eva.13215
[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: 10.1111/1365-2656.13284

[7] Cattel J., Faucon F., Lepéron B. **Sherpa S.**, Monchal M., Grillet L., Gaude T., Laporte F., Dusfour I., Reynaud S., & 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: 10.1111/eva.12867

[6] **Sherpa S.**, Guéguen M., Renaud J., Blum M.G., Gaude T., Laporte F., Akiner M., Alten B., Aranda C., Barre-Cardi, H., Bellini R., Bengoa Paulis M., Chen X-G., Eritja R., Flacio E., Foxi C., Ishak I.H., Kalan K., Kasai S., Montarsi F., Pajović I., Petrić D., Termine R., Turić N., Vazquez-Prokopec G.M., Velo E., Vignjević G., Zhou W., & Després L. (2019) Predicting the success of an invader: Niche shift versus niche conservatism. *Ecology and Evolution*, 9(22): 12658–12675; DOI: 10.1002/ece3.5734

[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: 10.1111/evo.13801

[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: 10.1111/mec.15071

[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: 10.1016/j.meegid.2017.12.018

[2] **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: 10.1016/j.ympev.2017.12.018

[1] **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: 10.1093/gbe/evx267

Outreach activities

2020: Article for the general public, available online at the Encyclopédie de l'Environnement (EENV) website: https://www.encyclopedie-environnement.org/vivant/pourquoi-moustique-tigre-invasif/

2018: Seminar lecture at the Entente Interdépartementale pour la Démoustication (EID Rhône-Alpes) I organized to present my work to vector control officers that participated in the collection of samples

2017: Presentation of the contribution of genetic studies for managing biological invasions to non-specialists (European Mosquito Control Association members) at the VIIIth EMCA Conference

SKILLS AND EXPERTISE

Scientific expertise	Research interests: Population genetics/genomics, Morphological evolution, Phylogeography, Local adaptation, Biological invasions, Conservation biology Principal investigator of a research project (design, experiments, application to funding calls, project management) Reviewer for *Evolution*, *Evolutionary Applications*, *Molecular Ecology*, *BMC Genomics*, and *Biological Invasions*
Technical expertise	Fieldwork (protocol design, behavioral study, sampling) Laboratory rearing (common garden experiments, breeding over several generations) Molecular biology (DNA extraction, mtDNA, microsatellite, ddRAD-seq, exon capture) Morphometrics (traditional and geometric morphometrics)

Software and programming	Programs (R, shell) Genetic data processing (eg, CodonCode Aligner, GeneMapper, Stacks, GATK, samtools, vcftools) Demographic inferences (eg, ADMIXTURE, RAxML, BEAST, DIYABC, stairwayplot, R packages) Morphometrics (MorphoJ, TPS, IMP) Ecological niche modelling (Maxent, BIOMOD) GIS and landscape connectivity (Quantum GIS, CircuitScape, R packages)

TEACHING ACTIVITY

Teaching activities in Bachelor and Master degrees (University Grenoble Alpes, in French)			
Year	Appointment	Number of hours	Content
03/2021	Teaching assistant	3h (practicals)	Landscape genetics
09/2019–12/2020	Lecturer	256h (lectures, tutorials, practicals)	Animal Biology, Evolution, Phylogenetics, Ecology, Population genetics, Landscape genetics, Scientific communication
10/2018–11/2019	Teaching assistant	19h (tutorials, practicals)	Population genetics
10/2016–08/2018	Doctoral student teaching program	135h (tutorials, practicals)	Population genetics, Population dynamics, Ecology

Mentoring activities	
04/2020–05/2020	MSc student (Tiphaine Bacot, Université Grenoble Alpes, France) Topic: Ecological and evolutionary processes driving phenotypic variation in invasive insects – *Aedes albopictus* as a case study
01/2016–01/2020	BSc student (Iliana Tosi, Université Grenoble Alpes, France) Topic: Designing an experimental protocol to study the cold tolerance of *Aedes albopictus* eggs from temperate and tropical regions

Declarations given in the present curriculum must be considered released according to art. 46 and 47 of DPR n. 445/2000.

The present curriculum does not contain confidential and legal information according to art. 4, paragraph 1, points d) and e) of D.Lgs. 30.06.2003 n. 196.

Grenoble, 07/07/2021

Stéphanie Sherpa