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I. Research trajectory and impact

My PhD on the dynamics of subdivided populations of newts had a behavioural component (*e.g.*, how amphibians orient towards their breeding site, predation on eggs [2, 4, 5, 6, 7¹]) and a population dynamics component (*e.g.*, capture and marking of individuals in a network of ponds, estimation of individual ages [3, 8, 9, 12]). It was an integrative approach that I would maintain throughout my work as a teacher-researcher (the name of my HDR is in fact 'Toward an integrative biology of Alpine amphibians'). From the time I was recruited to the University of Savoie, I directed my research towards the specificities of mountain ecology, always with this integrative approach with the Lanza Salamander ([13, 15, 16, 18, 22, 26, 31] and the Common frog ([8, 32, 40, 42, 46])). While research on the first species is devoted to understanding the ecology of this recently discovered species, research on the second species is concerned with evolutionary ecology: it is widespread in Europe from France to the Arctic Circle and from the plains to 2500 m a.s.l. in the Alps. It therefore offers the opportunity to study populations distributed along latitudinal and altitudinal gradients, which have been studied extensively by Scandinavian scientists and myself in relation to the Alps. I have developed a quantitative genetic approach (mainly using egg and tadpole rearing) to detect local adaptations in populations at high altitude but also along pollution gradients (PAH), which have demonstrated the existence of numerous local adaptations for resistance to UV exposure, development time, etc. [32, 33, 40, 42, 46, 62] and co-tolerance to genotoxic effects (UV and PAH). Still in this spirit of an integrative approach (after some works in phylogeography using mitochondrial genetic markers [15, 16, 25, 41]), I began to integrate population genetics analyses into my ecology tools ([21, 30, 48] to answer questions about population functioning (metapopulation structures, barriers to dispersal, etc.). In 2006, as luck would have it, Francesco Ficelota, François Pompanon, Pierre Taberlet and I (all members of LECA Grenoble-Chambéry) asked ourselves the question of using molecular biology tools to detect aquatic species: don't these organisms leave bits of DNA in the water that could be amplified and then assigned to species for inventory purposes? ... This led to **the first publication** [43] on the environmental DNA method applied to vertebrates (amphibians), and which will pave the way for the extraordinary development of the use of this method in all planetary ecosystems (1245 citations in 2026, WoS 03/03/2026). I took part in its deployment mainly through methodological work [51, 57, 68, 69, 72, 99, 103].

After a **Marie Curie fellowship in British Columbia** in 2007-2008, where I worked on invasive alien species (in this case the American bullfrog introduced into Europe and western North America [35, 37, 41, 47, 74]), In 2009, I was involved in a European programme entitled 'Risk Assessment of Chytridiomycosis to European Amphibians', because of my expertise in exotic amphibians present in Europe and potentially carrying the etiological agents of diseases such as chytridiomycosis. This was the start of my epidemiological work [49, 52, 56, 66, 71, 76, 77, 81, 83, 90, 105], which led to the discovery of new diseases such as the Ranavirus affecting Common frog populations in the Mercantour massif. I continued this research and monitoring of amphibian diseases in France from 2012 to 2022, when **this activity finally became part of the SAGIR network** (wildlife disease monitoring network) administered by the OFB (French Biodiversity Office). Note that I am currently involved in a Region Occitanie program (AQUAPAT, 2025-27, PI Geraldine Loot, Toulouse) which aims to develop eDNA tools for aquatic pathogens.

In 2011, I joined the EPHE (Ecole Pratique des Hautes Etudes) as Director of Studies based in Montpellier (UMR Centre d'Ecologie Fonctionnelle et Evolutive). It was time for me to turn my attention to a field that was not close

¹ Number in brackets [x] refers to the list of publication.

to my heart (I'm originally from La Rochelle and I did a degree in Oceanology at the University of Western Brittany), namely the marine world. I was lucky enough to quickly obtain funding (**two European programmes as coordinator**, INDICIT <https://indicit.cefe.cnrs.fr/>) for the evaluation of bio-indicators to measure the pressure of plastic pollution at sea, as well as the evaluation of the policies of European states to reduce this pressure. These bio-indicators are the ingestion of litter by sea turtles and fish [79, 82, 86, 87, 88, 93], which has also helped to advance knowledge of the sea turtles that frequent the coasts of the French Mediterranean Sea [91, 92, 95, 102].

I have maintained an activity linked to amphibians and integrative ecology, within the framework of conservation science. These include a conservation programme for the toad *Pelobates fuscus* at the edge of its range (Julia Dayon's thesis, 2020-23, [106]) and the evaluation of small wildlife crossings (Guillaume Testud's thesis (2017-2019) and Meven Le Brishoual's (2023-25), [85, 89, 94], which led to an international collaboration on the effect of confinement in relation to the COVID-19 epidemic and wildlife activity [100].

In connection with marine ecology and the environmental DNA method, I was awarded an ANR grant in 2022 for a project entitled 'Ocean Megafauna Tracking by passive eDNA sampling', the main aim of which is to develop a non-invasive methodology for monitoring biodiversity, with a particular focus on mobile megafauna. Recently, passive filters immersed directly in water (such as montmorillonite and charcoal-based mineral powders) have been successfully used to collect eDNA in aquatic environments. This suggests the possibility of using passive eDNA sampling as an alternative to 'one shot' transect sampling in the context of mobile marine fauna monitoring. We **provided a proof of concept of the effectiveness of passive eDNA sampling** in marine waters [105], and we are now using these samplers to inventory vertebrates (fishes, marine mammals, ...) in the Mediterranean Sea, the Caribbean, Australia, South Africa, etc. In 2025, I obtained a grant from FranceAgriMer to inventory terrestrial ecosystems with airborne eDNA. This field is booming, and we will leverage our experience with passive sensors to apply it to airborne DNA.

Diploma :

1990 : PhD in Behavioural Ecology "Dynamics of subdivided populations: a comparative study in *Triturus alpestris*, *T. helveticus* and *T. cristatus* (Amphibia, Urodela)", 205 p. Institut d'Analyse des Systèmes Biologiques et Socio-Economiques, University of Lyon I., France. Defended 19 February 1990 with distinction and *summa cum laude*. Directeur de Recherches : Professeur L. CALLIERE Rapporteurs : Jean CLOBERT, Directeur de Recherches CNRS, ENS Paris et D. DEBOUZIE, Professeur, Laboratoire de Biométrie, IASBSE Lyon I.

2000 : HDR in Evolutionary ecology "Toward an integrative biology of Alpine amphibians", University of Savoie, France. Defended 31 January 2000 with distinction and *summa cum laude*. Jury : Mme I. TILL- BOTRAUD (Directeur de Recherches CNRS, Grenoble), rapporteur ; M. J. CASTANET (Professeur, Université Paris 6/7), rapporteur ; M. R. GUYETANT (Professeur, Université de Savoie), rapporteur ; M. J. BLONDEL (Directeur de Recherches CNRS, Montpellier), M. J-F. DOBREMEZ (Professeur, Université de Savoie), examinateur.

Professional course :

1990-1992 : Employee as hydrobiologist in a private company (ETEN, Annecy-le Vieux) April 1990-May 1992.

1992-1993 : Employee as wildlife biologist in the NGO "Ligue pour la Protection des Oiseaux" (Rochefort) from June 1992 to Sept 1993.

1993-1999 : Teacher-Researcher (Lecturer) permanent position obtained on 1st September 1993, at the University of Savoie (France).

2000-2001 : Researcher at the « Centre National de la Recherche Scientifique » Sept. 99-Sept. 2001.

2001-2006 : Teacher-Researcher (Lecturer) at the University of Savoie (France).

2006-2008 : Researcher at the University of Victoria, BC, Canada: Outgoing International Fellowship (Marie Curie) at the University of Victoria (BC), in Bradley Anholt's laboratory.

2008-2001 : Teacher-Researcher (Professor) at the University of Savoie (France).

2011-: Teacher Researcher (Directeur d'Etudes) at the High School of Applied Sciences (EPHE), Centre d'Ecologie Fonctionnelle et Evolutive Montpellier, France.

Laboratory direction :

Co-Director UMR CNRS 5553 laboratoire d'Ecologie Alpine (Grenoble-Chambéry) 2007-2010.

Co-Director UMR CNRS 5553 laboratoire d'Ecologie Alpine (Grenoble-Chambéry) 2011-2012.

Direction of the EPHE Laboratory "Biogeography and Ecology of Vertebrates, within the UMR 5175 Centre Ecologie Fonctionnelle et Evolutive of Montpellier, March 2012-2016.

Coordinator of the GRET Biogeography and Ecology of Vertebrates, 2016-2023.

International Research Programme application and management since 2011 (EPHE) :

2019-2021 : Coordinator of the European Program DG ENV "Implementation Of Indicators Of Marine Litter On Sea Turtles And Biota In Regional Sea Conventions And Marine Strategy Framework Directive Areas. 12 partners, 1,0 M€ (336 K€ for EPHE).

2017-2019 : Coordinator of the European Program DG ENV "Implementation of the indicator Impacts of marine litter on sea turtles and biota in RSC and MSFD areas. 10 partners, 1,3 M€ (336 K€ for CNRS).

2016-2019 : Leader of two Workpackages of the European Program INTEREG MED "Developing Mediterranean specific protocols to protect biodiversity from litter impact at basin and local MPAs scales" 6 partners, 2.2 M€ (385 K€ for EPHE).

2017-2020 : Coordinator for France of the European Program "Surveillance of the amphibian pathogen *Bsal* in western Europe » (4 partners), 200 K€ (64 K€ for EPHE).

National Research Programme application and management since 2011 (EPHE) :

2023-2027 : **Coordinateur de l'ANR OMTedNA** [Suivre la mégafaune marine par échantillonnage passif d'ADN environnemental], 5 partenaires, EPHE coordinateur (467 K€)

2019-2021 : Programme Région Occitanie « Connectivité biologique en milieux aquatiques : quantification, modélisation et compensation » 5 partners (19 K€ for CNRS).

2019 : Convention avec l'Agence Française pour la Biodiversité « Les outils moléculaires pour évaluer les continuités écologiques » (19 K€ for EPHE).

2019 : Convention avec le Ministère de la Transition Écologique et Solidaire « Dynamique des populations des Amphibiens de France métropolitaine » (33 K€ for EPHE).

2016-2019 : Coordinator of the contract with the private company EIFFAGE « Étude de la perméabilité de la LGV Bretagne Pays de la Loire (BPL) aux déplacements des amphibiens » (120 K€ for EPHE).

2016 : Coordinator of the program CNRS INEE PEPS Paysage « Un cas concret sur la fragmentation anthropique du paysage et la connectivité fonctionnelle des populations de Grenouille rousse (*Rana temporaria*) » (16 K€ for CNRS).

Elected responsibilities :

Member of the scientific committee of the University of Savoie (2004-2006)

Member of the UFR Centre Interdisciplinaire Scientifique de la Montagne (3 mandates)

Member of the Doctoral School (ED 472) of EPHE-PSL since 2020.

Supervision of students :

Licence-Master students: 2-3 students per year since 1996

PhD : 18 (9 as director ; 9 as co-director)

Alexandre Ribéron (1996-99) Biogéographie évolutive des salamandres noires dans l'arc alpin. 110 p + annexes.

Co-direction with R. Guyétant. Current position: MCF University P. Sabatier Toulouse.

Nathalie Pidancier (1998-2002) Analyse génétique spatialisée : le modèle Grenouille rousse (*Rana temporaria*),

229 p + annexes. Co-direction with P. Taberlet. Current position: Science teacher in a Lycée.

Patrick Gautier (1998-2003) De la communication chimique à la territorialité chez les salamandres terrestres d'Europe, 229 p + Annexes 143 p. Current position: School headmaster, Lyon.

Régis Martin (1999-2004) - Biodiversité génétique chez *Rana temporaria* (Amphibia: Anura). Approche intégrative le long d'un gradient altitudinal. 200 p. Current position: permanent position communauté de commune Isola 2000.

Aurélié Bonin (2003-2006) Génomique des populations et adaptations locales : exemple de la grenouille rousse *Rana temporaria* le long d'un gradient d'altitude (co-direction with P. Taberlet & F. Pompanon). Post-doc Australie (2006-2008), Post-doc University of Vancouver (2008-2010). Current position: Staff member society Argalis, St Hélène du Lac.

Helfer Véronique (2010) co direction with L. Fumigali, current position: Researcher University of Salzburg.

Olivier Marquis (2003-2006) Variations phénotypiques et adaptations locales en réponse aux stress environnementaux chez la Grenouille rousse (*Rana temporaria*). Current position: permanent position MCF MNHN, Paris.

Tony Dejean (2008-2011) L'infestation des Amphibiens de France par le champignon *Batrachochytrium dendrobatidis*. Prévalence, modes de dispersion, risques sur les populations et moyens de prévention. Current position: head of the company SPYGEN.

Hugo Cayuela (2012-2015) - Réponse évolutive à l'instabilité des habitats chez le sonneur à ventre jaune (*Bombina variegata*) co-direction with P. Joly & A. Besnard. Current position: post-doc Univ Berne, Switzerland.

Mohamed Tani Iboroi (2013-2016) – Génétique et dynamique de populations de Mégachiroptères de Mayotte (co-direction with A. Besnard). Current position: researcher Univ. Mayotte

Charlotte Francesiaz (2014-2016) - Sites suivis pour la reproduction du goéland railleur en Méditerranée (co-direction with A. Besnard). Current position: staff member OFB.

Sebastià Camarasa i Arbós (2014-2017) – Ecologie des populations d'Euproctes des Pyrénées (co-direction with Delphi Sanuy and Claudine Montgelard).

Fabrice Darinot (2017-2019) – Fonctionnement des populations de Campagnols des moissons dans un paysage imprévisible. (co-direction with Claudine Montgelard). Scientific responsible Nat. Reserve.

Guillaume Testud (2017-2019) - Evaluation des batrachoducs le long de la LGV Le Mans-Rennes. Bourse CIFRE (EGIS-EPHE). Current position: staff member OIKOS and Univ Eiffel.

Delphine Gambaiani (2019-2022) – Impact de la pollution plastique sur la biodiversité de la Méditerranée. Bourse programme Interreg MEDSEALITTER. Current position ; staff member rescue center.

Julia Dayon (2020-2023) – Viabilité des populations de Pélobate brun en limite de leur aire de répartition. Bourse CIFRE OGE-EPHE.

Dimitri Médétian (2022-2025) – Detecting low density and mobile marine species thanks to of passive eDNA samplers. EPHE ED grant.

Meven Lebrishoual (2023-2025). Evaluating underpasses structures for small vertebrates. Behaviour and population dynamics. Bourse CEA, co-direction avec J. Jumeau (CEA).

Post-doct: 8 as director

Francesco Ficetola (2006-2008): current position, CR2 CNRS (University of Grenoble, France).

Alice Valentini (2010-2012): current position: R&D in the private company SPYGEN (France).

Darmon Gaele (2014-2015) : Définition des seuils d'un Objectif de qualité environnementale (EcoQO) pour l'impact des déchets marins sur les tortues marines en Europe. Contrat Ministère de l'Environnement et du développement durable et IFREMER.

Mansui Jérémy (2015) : Courantologie de la méditerranée pour l'étude de la dérive des macro-déchets. Contrat Ministère de l'Environnement et du développement durable et IFREMER.

Darmon Gaele (2017-2019): Implementation of the indicator "Impacts of marine litter on sea turtles and biota" in RSC and MSFD areas. European program of the DG ENV.

Mansui Jérémy (2019) : Courantologie de la méditerranée pour l'étude de la dérive des macro-déchets. Programme Interreg MEDSEALITTER.

Darmon Gaele (2019): Evaluation of risk areas for biota in RSC and MSFD areas. Programme MEDSEALITTER.

Darmon Gaelle (2019-2020): Implementation of the indicator “Impacts of marine litter on biota” in RSC and MSFD areas. European program of the DG ENV.

HDR : 1 as director

Jonathan Jumeau (2026) : current position : Researcher at CeA (Strasbourg, France)

phD and HDR jury :

phD: Jury as member: 11, as reviewer: 13, as president : 11.

HDR (accreditation for research supervision): jury as reviewer: 5

phD committee : 14

Expert activities in conservation biology :

- Member of **UICN** (committee SSC « Species Survival Commission) since 2007. Author of several texts on amphibians for the red list of threatened species in France. Co-author of a mention for the next UICN committee in Marseille (2020) on sea pollution by marine litter.
- **President of the scientific council** of the Regional Scientific Conservatoire of Natural landscape for the Rhône-Alpes region (since April 2010, end in 2018).
- Member of the Scientific Council of the National Park “La Vanoise” (2 mandates) and Vice-President of the scientific council in 2010.
- Member of several **scientific councils** of Nature reserves since 1993.
- **Expert** for the DREAL Rhône-Alpes (Regional representative of the Ministry of Environment) since 2000: Several expertise in conflictual situations.
- Since 2017: Member of the scientific council of the Regional Scientific Conservatoire of Natural landscape (CSRPN) for the Region Occitanie.
- Since 2021: **Elected member** of the « **Conseil national de la protection de la nature** » (<https://www.ecologie.gouv.fr/conseil-national-protection-nature>)

Research evaluation :

- Expert for the Belgium National Science foundation since 2008.
- Expert for the Quebec Research fund – Nature and technology since 2010.
- Member of the French Evaluation Committee HCERES V2-SV2 in 2016.

Scientific societies :

- President of the French Herpetological Society 2019-October 2026 (<http://lashf.org/>)
- Vice- president of the French Herpetological Society (1998-2004 and 2010-2014).
- Scientific advisor of the private laboratory SPYGEN (2010-2016) www.spygen.com

Editorial boards and reviewing :

- Member of the editorial board of Amphibia-Reptilia and Wildlife Biology.
- Regular reviewer for Animal conservation, Behavioural Ecology, Canadian Journal of Zoology, Conservation Biology, Journal of Zoology, Journal of Animal Ecology, Molecular Ecology, Biological Invasions, Population Ecology, Zoology, Herpetological Journal, Herpetologica, Amphibia-Reptilia, Journal of Herpetology.
- Chief Editor of the « Bulletin de la Société Herpétologique de France » (4 issues/year) in 1999-2008.

Invited conferences since 2011 (EPHE) :

2026 : Meeting of the eDNA Japanese Society : eDNA : a French story. Sendai, Japan, 10-11 October 2026.

2019: International Sea Turtle Society Annual Meeting. Plenary lecture at the Workshop Marine Debris and Sea Turtles “Implementing of indicators of marine litter impact on biota: Focus on networking and standardization of protocols” Charleston SC, USA, 2-8 February 2019.

- 2018:** UE Directorate Generale Environment. Working Group marine litter “Presentation of the INDICIT programme progress on the GES evaluation”. Brussels, Belgium, 21 February 2018.
- 2016:** Plenary lecture at the French-Belgium herpetological Meeting « Les maladies émergentes chez les amphibiens ou l'émergence des connaissances des maladies chez les amphibiens ? » Namur, Belgium, 22-24 octobre 2016.
- 2015:** Workshop International Union for the Conservation of Nature (IUCN), FSC impact evaluation: field-based environmental impact assessment in the Peruvian Amazon. 15-17 May 2015, Lima, Peru.
- 2015:** Plenary lecture at the joined meeting IUCN & WWF “Biodiversity in a Drop of Water: The New Opportunity of Environmental DNA (eDNA)”. Fuller Symposium Workshop “*Bright Green Minds: A Conservation Tech Conversation.*” November 19th, 2015, Washington D.C., USA.

Congress organisations :

My team at the University of Savoie has managed the IXst Congress of the European Herpetological Society, 25-29 August 1998 (180 participants; 22 nationalities). I have been President of the scientific committee and co-Editor with R. GUYETANT of the proceedings: ***Current studies in Herpetology, SEH, Le Bourget du Lac, France***, Miaud C. and R. Guyétant (Eds), 1999, 480 p.

- I organised the Annual Meeting of the French Herpetological Society in Virton (2002), Yvoire (2004) and Grenoble (2010).

Distinction :

I obtained in 2006 a grant “excellence” in the programme Marie Curie “Outgoing International fellowship” (funding of 3 years’ salary), allowing to be invited researcher at the University of Victoria (British Columbia, Canada).

Nominated for « Chevalier de l’Ordre National du Mérite (3 December 2025) » by the Ministry of « transition écologique, de la biodiversité et des négociations internationales sur le climat et la nature » for 40 years at the service of Biodiversity knowledge and protection.

Teaching topics and responsibilities :

Topics:

- Main lectures in: Behavioural Ecology, Population biology and Zoology (Licence).
- Others lectures in: Life History Evolution and Biodiversity, Ecotoxicology (Licence and Master)
- Practical teaching in Zoology, Behavioural Ecology and Population Biology (Licence and Master)

My teaching activity is about 200 hours/year since 1993, except during the period of researcher position (CNRS and University of Savoie), until December 2011.

My teaching activity at the EPHE is about 65 hr/yr. I have been in charge of two complete lectures (1 week each) in the Master EPHE-PSL.

Other teaching:

- Doctoral school of Turin: Seminars on local adaptations and conservation biology (6h/3 years)
- Doctoral school of Almaty (Kazakhstan): Seminar on Evolutionary Biology and Ecotoxicology.

Responsibilities:

At the University of Savoie (1993-2011): Leader of the Licence “Life Science” (700 students) from 1999 to 2006.

At the EPHE, since 2017: I have been in charge of the building of the « Biodiversity and Environment » program in the new Master PSL (Master of the Consortium Paris-Sciences-Lettres).

I have been in charge of the UE Population biology from 2017 to 2021.

Outreach and science dissemination :

- I participated by writing book for scientists and naturalists e.g. "Identify the eggs and larvae of Amphibians of France (INRA Editions 2004, reissued in 2007), and I am currently writing a monograph on the frog as biological model.
- I wrote the pages devoted to species (Alpine newt, Common frog, Alpine Salamander, Lanza Salamander) and life adaptation at high altitude in the "Encyclopedic Dictionary of the Alps, Editions Glénat, 2006).
- I wrote the monographs of several species of amphibians in the "Atlas of Reptiles and Amphibians distribution of France" (SHF & MNHN Eds, 2011).
- I wrote or edited several sheets of red book species of amphibians in France (IUCN).
- I wrote a synthesis paper on the Amphibian killing fungus in the large audience journal "Le courrier de la Nature" in 2013.
- I participated in interviews in local newspapers ("Le Dauphiné Libéré") and national ("Libération"), foreign ("Terra Mater"), and popular magazines ("Nature Sauvage", "National Geographic") and for young people ("Wapiti", "Sciences et Vie junior").
- I participated in radio (France Bleue, Radio Suisse Romande, Radio France International, France Inter (La tête au carré), France culture (La méthode scientifique) and a popular science television show (" C'est pas sorcier " France Télévision).

III. Landmarks of the Academic Career

1990 : PhD in Behavioural Ecology at the University of Lyon (France)

1993 - Recruitment as **Lecturer** at the University of Savoie (Chambéry, France).

2000 : HDR in Evolutionary ecology at the University of Savoie (Chambéry, France).

2000-2001 : Researcher at the « Centre National de la Recherche Scientifique » Sept. 99-Sept. 2001.

2006-2008 – Invited researcher at the University of Victoria (BC, Canada), Grant OIE Excellence, UE.

2009 : Recruitment as **Professor** at the University of Savoie (Chambéry, France).

December 2011 – Recruitment as « **Directeur d'Etudes** » (DR 1ère Classe) at the Ecole Pratique des Hautes Etudes (EPHE). **Director of the laboratory** « Biogeography and Ecology of Vertebrates », within the JRU 5175 CEFE in Montpellier.

2014 – Starting of my **research activity in the marine environment**, especially with Sea Turtle conservation (marine litter impact, diet, genetic).

2015-16 – Writing and submission of proposal to two **European Call for tender** (INTEREG and DG ENV) on marine litter impact on the Mediterranean megafauna.

2017 – 2022 Success and starting of **four European programs**, two as coordinator (10 and 12 partners) and two as main partner for France (6 partners each).

2023-2027 ANR Ocean Megafauna Tracking by Passive eDNA Sampling. Coordinator, 5 partners in France.

2025-2027 The Earth Hologenome Initiative. Coordinator of the sampling for amphibians in France.