

## Degrees, diplomas and the equivalent

2008: Phd with European label: "Satellite remote sensing for the monitoring of Camargue wetlands in relation to their avifaunistic interest", ESPACE (UMR CNRS 6012) University of Provence, Tour du Valat, ONCFS (national office for hunting and wildlife); France, Supervisors: Dr Brigitte Poulin, Dr Gaetan Lefebvre, Prof Jean-Paul Ferrier, Jean-Yves Mondain-Monval, Dr Michel Deshayes

2002: DEA ESTEA (space and society, remote sensing, environment and planning), University of Haute Bretagne Rennes 2, France, COSTEL laboratory (UMR CNRS 6554) under the supervision of N. Dupont. Subject: Monitoring of the evolution of the agricultural plot on the banks of the Semnon, a Breton river.

2001: Master's degree in biology of populations and ecosystems, mention environment, University of Rennes 1, France.

2000: Bachelor Degree in biology of organisms, University of Rennes 1, France.

1999: DEUG (first year degree at university) sciences and technologies mention life science, Faculty of Sciences of Limoges.

1997: Preparatory class BCPST (Biology-chemistry-physics-science and life of the earth), Lycée Camille Guérin, Poitiers, France.

1996: Scientific baccalaureate specializing in mathematics, Lycée Raymond Loewy, La Souterraine, France.

## Previous employment

Since 2011: Associate professor ("Maitresse de conférences") Ecology and Spatial Analysis, University of Angers, Department of Biology, France.

Since 09/2024: Visiting researcher Lammi biological station, University of Helsinki, Finland

09/2022 - 08/2024: Kone grantee, researcher Lammi biological station university of Helsinki, Finland

2009 - 2010: Post-doctoral position "Habitat modeling for migratory waterfowl in the boreal area" in the program "Climate change and European Flyways". Institute of Geography, Friedrich-Alexander-Erlangen-Nuremberg University; Germany

2008-2009: Post-doctoral position "Study of wetland potentialities as migratory bird habitats using remote sensing" Institute of Geography, Institute of Applied Mathematics 3, Friedrich-Alexander-University Erlangen-Nuremberg; Germany.

2009 „Satellitenfernerkundung und Geographische Informationssysteme für Umweltbeobachtung“ (Satellite remote sensing and GIS for environmental monitoring), Summer semester 2009, Friedrich-Alexander-Erlangen-Nuremberg University, Institute of Geography (Germany), Lectures and tutorials, Level: Bachelor at Magister (semester 3 to semester 9), 22 hours

2003: Teaching assistant for national education in the life sciences and earth for classes 6th, 5th, 4th and 3rd levels at the College Camille Guérin, Saint-Méen-le-Grand, Ille et Vilaine (35), 195 hours.

## Positions based on academic and pedagogical merits

Socially significant elected positions or expert assignments based on academic or pedagogical merit

2016-2018: elected member of the academic council of the Bretagne Loire university (UBL)

2012-2021: elected member of the LETG research unit council (CNRS UMR 6554), France

Significant positions based on academic and pedagogical qualifications

Head of the master EEZH and of the mention BEE: from September 2016 to September 2019, I was at the head of the master program "ecology and eco-engineering of wetlands". The first year was carried out in co-supervision with Cyril Fleurant (professor at the department of geography) then I took the full responsibility with the mission of setting up the new program. The master program, multidisciplinary, was shared between the departments of geography and biology of the University of Angers and therefore offered two mentions "biodiversity, ecology, evolution" (BEE) and "geography, planning, environment, development sustainable" (GAED), courses were also shared with other programs. This involved a triple management over 3 administrative services of the university with different operations and an engineering school of the Ministry of Agriculture. The master is based on a professional background, it was thus necessary to build the network of stakeholders involved in the training and ensure that the budgets are distributed equitably among the different structures. I was responsible for the BEE mention that included to be the president of juries and boards of the master program at Catholic University of Angers.

## Positions of scientific expertise

### Councils and work groups

Since April 2018: elected member of the scientific council of CEN (conservatory of natural spaces) Pays de la Loire (<http://www.cenpaysdelaloire.fr/>), France

2017-2021: elected member of the scientific council of OSUNA (observatory of universe sciences, Nantes-Atlantique, <http://www.osuna.univ-nantes.fr/>), France

Since 2021: member of the scientific and pedagogical council of the house of the lake Grand Lieu, nominated by the region Pays de la Loire, France.

Since 2021: member of the steering committee of the Natura 2000 zone "Loire Valley from Nantes to Ponts-de-Cé and its annexes", France

2019: member of the work group "wetlands" SAGE (water development and management plan) Layon Aubance Louets, France.

2015: geomatic expert member in the coastal challenge workshop “adaptive and prospective management to guide research on a changing coastal area”, former saltworks of Camargue, south of France.

### **Reviewer**

Research projects: 2012 and 2015: Expert reviewer for the Executive Agency for Higher Education, Research, Development and Innovation Funding, Romania

Journals: Remote sensing of environment, Remote sensing, Environments, International Journal of Applied Earth Observation and Geoinformation, Applied vegetation science, Association of American geographer, Ecological indicator, Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Journal of the Surveying and Spatial Sciences Institute, Geoinformatics & Geostatistics: An Overview, river research and application, Basic and applied ecology, Environmental modelling and software, European journal of remote sensing, Frontiers.

### **Experience leading a research group**

2022: Wetland biodiversity in hunting marshes of Vendée in France. Funding: French hunting federation and French biodiversity office. Partners: CNRS UMR LEHNA, CNRS UMR LETG, Hunting federation of Vendée. Staff: 2 Master students, 3 technicians.

2022-2025: POOL - The role of seasonal wetlands as biodiversity hotspots and nature-based solution to water quality decline in the Finnish boreal forest ecosystems: a multi actor and transdisciplinary approach, Funding: Kone foundation, Partners: University of Helsinki, Turku university, University of Angers, Häme University of Applied Sciences, CNRS UMR LEHNA, Vanajavesi centre, Finnish Environment Institute (SYKE), United Paper Mills Forest (UPM Forest), photographers, painters, musicians and performers. (Principal investigators: Céline Arzel (Uni Turku), Aurélie Davranche (Uni Helsinki), Petri Nummi (Uni Helsinki)). Staff : 19 Master students, 1 PhD Student, 1 post-doc.

2021: Statistical analysis of a database on waterbirds in the Marais Breton and recommendations for habitat management in collaboration with the departmental federation of Hunters of the Vendée. Funding: departmental federation of Hunters of the Vendée. Partners: LETG, LEHNA, University of Turku (Principal investigator: Aurélie Davranche and Jean Secondi, university of Angers). Staff: 1 post-doctorant, 3 researchers, 1 manager of natural habitat, 2 technicians.

2020 - 2022: RADIANCE - Networks of small wetlands and the browning of surface water: from the Adaptation of Amphibians to social representations, Funding: University of Angers, LETG, LEHNA, University of Turku, University of Helsinki. Partners: Biological station of Lammi, LETG, LEHNA, department of biology of the University of Turku (Principal investigator: Aurélie Davranche)

2020: Land use dynamic over the Grand Lieu watershed in connection with the dynamics of the habitats of macro-invertebrates in the lake, partners: MMS, LETG Nantes, Réserve de Grand Lieu, ECOBIO and OSUNA, funding: OSUNA, LETG. Partners : CNRS UMR LETG Angers, LETG Nantes, MMS (Principal investigator: Aurélie Davranche). Staff: 5 researchers, 1 master student.

2019- 2020: MISMATCH - Movement of a Migratory Specie, the Eurasian wigeon (*Mareca penelope*), and use of its Habitat: is the network of protected natural areas sufficient to meet the needs of migratory waterbird populations ? Funding: PEPS ECOMOB CNRS. Partners: LETG Angers, Department of Biology and Environmental Science\_University of Kalmar (Sweden), University of Turku, TERRANIS (Principal investigator: Aurélie Davranche). Staff: 4 researchers from academic sector, 1 researcher from the private sector, 1 product director manager from the private sector.

2017: WETLANDSPACE, setting up an international scientific network for wetland monitoring and management at the catchment scale. Funding: ANR (national research agency). Co-coordinators: Aziz Ballouche, Aurélie Davranche, Nuscia Taïbi. Partners: LETG (France), University of Dakar (Senegal), University of Nantes (France), University of Algarve (Portugal), Polytechnic University of Marche, Ancona (Italie), University of Liège (Luxembourg), University of Coimbra (Portugal), University of Würzburg (Germany), University of Toliara (Madagascar), PRCM (Senegal), Peregrine Fund (Madagascar), University of Sassari(Italie), Posada municipality (Italy), University of Toulouse (France), University of Bamberg (Germany), University of Helsinki (Finland), National Center for Environmental Research (Madagascar), the vanajavesi center (Finland), National Agency for Regional Planning at Saint Louis (Senegal). Staff: 21 researchers from the academic sector, 4 other stakeholders.

### **Scope and management of external research funding and projects**

2022: Wetland biodiversity in hunting marshes of Vendée in France. Funding: French hunting federation and French biodiversity office (26 k€). Partners: CNRS UMR LEHNA, CNRS UMR LETG, Hunting federation of Vendée. Principal investigators: Sébastien Faro, Jean Secondi, Aurélie Davranche. Involvement: project coordination, budget management, master internship, fieldwork, staff management, partner meetings including stakeholders, communication and outreach, satellite remote sensing of water hydroperiods and drone remote sensing of vegetation parameters and water quality.

2021: How management impact bird biodiversity of the Marais Breton (France)?, Funding: Regional hunting federation of Vendée (25 k€). Partners: CNRS UMR LEHNA, CNRS UMR LETG, Hunting federation of Vendée, university of Turku. Principal investigators: Sébastien Faro, Jean Secondi, Aurélie Davranche. Involvement: project coordination, budget management, Post-doctoral contract management, fieldwork, partner meetings including stakeholders, paper writing, discussions on statistical analysis of bird population database and environmental variables.

2022 – 2025: POOL Budget: 220 k€, project coordination, budget management, master internship, fieldwork, staff management, partner meetings including stakeholders, communication and outreach. Research activities: satellite and drone remote sensing of wetland vegetation parameters, water quality and hydroperiods, sediment analysis and greenhouse gas monitoring.

2020 - 2021: RADIANCE Budget: 7k€, master internship, fieldwork, partner meetings. Research activities: detection of seasonal wetlands in European boreal forests

2019- 2020: MiSMATCH Budget: 15k€, coordination of work between private and academic partners, meetings, paper writing, field work. Research activities: development of a remote sensing routine for automated classification of LULC at stop-over areas along the whole flyway according to species ecological requirements.

2017: WETLANDSPACE setting up an international scientific network for wetland monitoring and management at the catchment scale. Budget: 30k€. Several partner meetings, budget management, international project proposal writing (3 ITN, 1 BIODIVERSA submitted).

## Scope and involvement in other projects as partner

2021 – 2023: Effects of large herbivorous waterfowl in aquatic ecosystems. Funding: Swedish Environmental Protection Agency". Partners: University of Kristianstad, University of Kalmar, CNRS UMR LETG, University of Helsinki.

Principal investigator: Gunnar Gunnarsson. Involvement: modelling of biophysical parameters from drone data acquired over 10 wetlands (vegetation, water quality, geese disturbance) in an agricultural landscape

2022 – 2027: ZHOST – « Pour une meilleure connaissance et gestion des Zones Humides des Oasis de la vallée du fleuve Sénégal et Tunisiennes » (For a better knowledge and management of Oasis wetlands in Senegal and Tunisia). Funding: CNRS (70k€). Partners: CNRS UMR ESO (France), University Cheikh Anta Diop of Dakar (Senegal), INALCO Paris (France), University of Paris 8 Vincennes Saint-Denis (France), University of Gabès (Tunisia), University of Helsinki. Principal investigator: Nuscia Taïbi. Involvement: development of an automated remote sensing method to monitor the hydroperiods and vegetation changes of ephemeral wetlands in Senegal and Tunisia in relation to bird migration and based on Fulani literature and local population knowledge.

2020-2025: DISRUPT - Ducks as models for assessing endocrine DISRUPTing chemicals in the aquatic environment. Funding: Academy of Finland (115 k€). Partners: university of Aarhus (Denmark), Norwegian University of Science and Technology (Norway), San José State university(US), University of Nantes (France), University of Iceland's Research Centre at Snæfellsnes (Iceland), Estonian University of Life Sciences (Estonia), University of Helsinki (Finland), Åbo Akademi University (Finland), LUKE\_ Natural Resources Institute Finland, TUKES\_Finnish Safety and Chemicals Agency, SYKE\_Finnish Environment Institute, Jyväskylä university (Finland), Bengtskär Oy (Finland), Kaiturin tila (Finland), Common Goldeneye ringers. Coordinator: Céline Arzel. Involvement: satellite remote sensing for mapping land uses susceptible to impact habitats where waterbirds are contaminated.

2018 – 2025: WATBRO – water browning and land use in a forest landscape. Funding: Finnish Cultural Foundation, EDUFI, Societas pro Fauna et Flora Fennica, Lammi biological station (99k€). Coordinator: Céline Arzel. Partners: Turku university, university of Helsinki, university of Angers, university of Nantes, LUKE\_ Natural Resources Institute Finland, Häme University of Applied Sciences, Vanajavesi keskus, North Karjala Centre for Economic Development, Transport and the Environment. Involvement: Remote sensing of lake water quality.

2010-2022: Adaptive management of the lagoons and marshes of the former salt marshes of the Camargue with the objective of reconversion and restoration of a highly anthropized site using a multidisciplinary and integrative approach. In 2010, the Conservatoire du Littoral bought a large area of the former salt marshes of the Camargue. Their management has been entrusted by convention to the Regional Natural Park of Camargue, the National Society for the Protection of Nature and the Tour du Valat. I have participated to two main actions. (i) The monitoring of NATURA 2000 habitats: based on my PhD work showing interest of satellite remote sensing for monitoring Camargue marshes by limiting data acquisition on field, 3 master internships and a PhD project was funded by the Tour du Valat research center and the University of Angers. (ii) Sedimentary dynamics of the site and flood regime in the Camargue: this work has also shown the importance of monitoring flood regimes in order to understand the sedimentary dynamics of the site. Thus, sediment records of the first deposit layers (since the purchase of the area by the coastal conservatory) were carried out in collaboration with Mohamed Maanan of LETG Nantes in order to establish a cartography of sediment inputs in the area. I have co-supervised Pierre Pouzet post-doctorant for the analysis of the sediments. I am the main author of the paper resulted from this study I managed from field campaign to result dissemination. In parallel in the frame of the Master thesis of Clement Merle, we adapted the mapping model of flooding regimes developed during my PhD. The adaptation of the model was made possible thanks to funding from the European H2020 ECOPOTENTIAL and SWOS projects which applied the model to the Mediterranean area more broadly.

2014-2023 ILLUMIN - Impact of light pollution on populations in wetlands, study of the effects on different climatic zones. The growth of population and communication routes as well as urbanization on a global scale has led to a rapid expansion of artificial lighting at night, which creates anthropogenic pollution called " Artificial Light at Night" (ALAN). This project is led by Thierry Lengagne at UMR CNRS 5023 LEHNA who called on my skills in geography to tackle the spatialisation of this phenomenon. In this context, I supervised the Master 2 internship of Brahim Ali Koreimy at LETG Angers, funded by the Institute of Complex Systems in Lyon (5k€), which aimed at assessing agent-based modelling to produce scenarios of the exposure of agricultural wetlands to light pollution in the Dombes area in France. This work was made possible with the Master thesis work (first year) of 2 students whom I supervised, Margot Porteous on the mapping of the direct light to estimate its impact in ALAN sources and Tom Lorée who estimated how crop surfaces can increase or decrease ALAN following the albedo values.

2011-2015 - Grassland birds in the lower valleys of Anjou - on my recruitment at the University of Angers, Jean Secondi, a researcher at the CNRS UMR 5023 LEHNA, calls for my skills in remote sensing to work in collaboration with two PhD students, Aurélien Besnard and Yoann Fourcade funded by the " Plan Loire Grandeur nature" to study the effects of mowing on grassland bird populations, knowing that some species such as the corncrake are vulnerable species in the region of Pays de la Loire. This program is a partnership between the region, cities and the institutional or associative stakeholders of the Loire basin.

## Cooperation with national and international research groups

CNRS UMR LETG Rennes (littoral, environment, remote sensing, geomatic, France), MMS (Sea, Molecules, Health, France) Nantes, CNRS UMR LEHNA (Laboratory of Ecology of Natural and Anthropized Hydrosystems) Lyon (France), Tour du Valat (research institute for the conservation of Mediterranean wetlands, France), TERRANIS (company, France), CNRS UMR ESO (Space and societies, France), INALCO (National Institute of Oriental Languages and Civilizations, France), French office for biodiversity (OFB, France), Institut de Recherche en Informatique de Toulouse (IRIT, France), Unité de Mathématiques et Informatique Appliquées de Toulouse (MIAT, France). Turku university (department of biology, Finland), university of Helsinki (department of forest science and biological station of Lammi, Finland), university of Bamberg (Germany), university of Dakar (Senegal), university of Toliara (Madagascar), university of Gabès (Tunisia), technological university of Munich (Germany), university of Erlangen (Germany), university of Würzburg (Germany), University of Algarve (Portugal), University of Kalmar (Sweden), University of Kristianstad (Sweden), Finnish Game and Fisheries Research Institute (Finland), Häme University of Applied Sciences (HAMK, Finland), Helmholtz-Zentrum für Polar und Meeresforschung Alfred-Wegener-Institut (Germany), Geosciences Rennes (France).

## Other international activities

Cooperation with stakeholders: Vanajavesi centre (Finland), National Agency for Regional Planning at Saint Louis (Senegal), UPM forest (Finland), Hunting federation of Vendée (France), Finnish Environment Institute (SYKE). Establishment and management of ERASMUS agreements: between the university of Angers and the university Linnaeus of Kalmar (Sweden) since 2020, the university of Bamberg (Germany) since 2019, university of Algarve (Portugal) since 2018, university of Würzburg (Germany) since 2016. Participation to International course sessions: NOVA joint course for Master and PhD students on Wetland ecology and management. 3.5 ECTS, Lammi Biological Station, 2-6th of September 2019. ERASMUS Mobilities: 2022: University of Helsinki (Finland), field work protocols in boreal vernal pools (20h) 2022: University of Bamberg (Germany): geomatic and water quality in the German Alps (8h) 2021: University of Kalmar (Sweden): wetlands from geomatic to people (8h) 2021: University of Bamberg (Germany): geomatic and water quality in the Scharzwald (8h) 2021: University of Helsinki (Finland): remote sensing to identify habitats used by declining migratory bird species, detection of small wetlands using satellite remote sensing (8h) 2019: University of Bamberg (Germany): geomatic and landscape connectivity (8h) 2018: University of Algarve (Portugal): remote sensing applied to landscape ecology (8h) 2016 and 2017: University of Helsinki (Finland): remote sensing for ecological restoration, geomatic for ecology (8h) 2016 and 2017: University of Würzburg (Germany), remote sensing applied to landscape ecology (8h) Management of an international participatory data base on water and vegetation measurements

## Honours and awards by scientific societies

2021: 4-year project grant from the Kone Foundation for the POOL project  
2021: 1-year project grant from the national hunting federation and the national biodiversity office. (Budget: 26417 euro)  
2021: 6-month project grant from the regional hunting federation of Vendée to hire a post-doctoral employee. (Budget: 25285 euro)  
2021: 6-months CNRS delegation awarded by the section 39 (space, territory, society) (teaching break)  
2020: First ranked by the CNU 23 section for the allocation of a 6-months CRCT (teaching break)  
2020: 6-months CNRS delegation awarded by the section 39 (space, territory, society) (teaching break)  
2020: AOI OSUNA, project on the evolution of land use in the Grand Lieu watershed in connection with the dynamics of the habitats of benthic macro-invertebrates in the lake. (Budget 4800 euro)  
2018: PEPS CNRS ECOMOB (MISMATCH project) (Budget 15,000 euro)  
2016: Doctoral contract " UA on project " of the research commission of the University of Angers, co-financing of a thesis entitled " Characterization and monitoring of the dynamics of landscape evolution of the former salt marshes of the Camargue by remote sensing "  
2011: Qualification by the section CNU 67 (Population biology and ecology)  
2010: 9th position in the ranking of the 25 most downloaded articles between January and March 2010 of the journal Remote Sensing of Environment  
2010: ISIS program (Incentive for the Scientific Use of SPOT Images) from CNES (National Center for Space Studies) for the acquisition of 5 SPOT scenes in western Denmark.  
2009-2010: Frauenpreis from the University of Erlangen-Nuremberg  
2009-2010: Postdoctoral stipend University of Erlangen-Nuremberg  
2009: ISIS program (Incentive for the Scientific Use of SPOT Images) from CNES (National Center for Space Studies) for the acquisition of 5 SPOT scenes over southern Finland.  
2008-2009: Postdoctoral stipend University of Erlangen-Nuremberg  
2007: PhD stipend Tour du Valat  
2004-2007: ONCFS thesis grant (National Office for Hunting and Wildlife)

## Research vision

My research deals with nature-society interactions. Starting from the needs of local stakeholders, I seek to develop remote sensing tools and state indicators, reflecting the conditions of health, artificialisation and threats to wetlands in diverse landscapes from boreal forests to semi-arid zones and for a long-term monitoring, at different spatial scales. The multispectral and multitemporal data extracted from high-resolution satellite and drone images, combined with rigorous field surveys, allow monitoring these landscapes while limiting or even avoiding the costs of new sampling. My multidisciplinary education combining ecology, geosciences, biogeography and mathematics allows me to best explore environmental analysis for different study scales. I work on the development of robust models, reliable and resistant statically. I implement statistical methods easy to understand and easy to interpreted, for an automated mapping of biophysical parameters. I seek to bring tools that help the management of these environments. I therefore work in direct contact with managers in order to develop tools that best meet their needs and constraints. Recently, I have developed my skills in dealing with big data of satellite remote sensing through the use of google earth engine directly on the platform and on R via Python, and the use of the sentinel hub. I am now developing routines for series of drone images in diverse landscapes (agricultural and forest environments) combined with fine resolution of satellite images (Planet program for instance) to monitor biophysical parameters and help improving nature based solutions and adaptive management in watersheds.

## Qualifications in doctoral training

**Co-supervision:** Imrana Aliyu, 2019- 2023: Geo-spatial Mapping and Monitoring of the Impacts of Oil Spillage on the Niger Delta Mangroves using Microwave and Optical Satellite Imageries, funding: Petroleum Trust Development Fund (PTDF) PhD full funding scholarship, these campus France. Julie Campagna, 2015-2019 : Predictive modeling of the evolution of a coastal area: contribution of remote sensing to understand the management and services of a changing territory; the case of the ponds and marshes of the Salins de Camargue. Co-financing of the University of Angers and the Tour du Valat research center.

**Phd supervising committee:** Uma Siegdal 2021-2025: Towards a sustainable management of temporary wetlands: Learning from local ecological knowledge to improve biodiversity, University of Turku. Supervisor: Céline Arzel. Clarisse Blanchet 2021- 2025: Natural and anthropogenic disturbances in the boreal forest environment - Impact of forestry and beaver on browning and lake ecosystem. University of Helsinki. Supervisor: Petri Nummi. Ricardo Andriatsiaronandroy 2015-2018: Recent dynamics and evolution models of mangroves in the Toliara region (Madagascar), under the direction of Nuscia Taibi, University of Angers and University of Toliara.

**Postgraduate supervision:** 2021: Gwendoline Percel, birds of the Marais Breton: what parameters explain populations?

## Scope of teaching experience

My first experience in teaching was for middle school levels in France for several groups at each grade from 6th to 9th in biology and geology for a total of 196 hours. Then I taught 22 hours of GIS and remote sensing in German and English to a groups of students from diverse levels from bachelor to PhD at the university of Erlangen (Germany). I got my position of associate professor at the university of Angers (UA) in September 2011. From 2011 to 2022 at UA I taught about 2042 hours with a teaching break for research of 1.5 years in 2021 and 2022. Here after the topic of the courses, levels and ECTS with responsibility (main responsible teacher=MRT): Applied ecology (Master, 1 ECTS), Project (Professional bachelor, 0.5 ECTS), Biogeography (Bachelor, 16 ECTS, MRT), Biostatistics (Bachelor and Master, 11 ECTS), Community ecology (Master, 1 ECTS), Conservation biology (Master, 1 ECTS), Environmental diagnosis (Master, 3 ECTS), Geography (Bachelor, 11 ECTS), GIS and remote sensing (Master, Bachelor, 35 ECTS, MRT), Landscape ecology (Master, professional bachelor, 6 ECTS, MRT), Method in bibliographical review (Bachelor, 0.5 ECTS), Professionnal insertion (Master and bachelor coordination of internship, thesis writing advises, 11 ECTS), Zoology (Bachelor, 3 ECTS), Ecological landscaping (professional bachelor, 3 ECTS), Field work campaign (0.5 ECTS). Also, I had several international experiences of teaching through ERASMUS agreements which I organized and I am responsible at UA. 2022: University of Helsinki (Finland), field work protocols in boreal vernal pools (20h, Master and Phd students), 2022: University of Bamberg (Germany): geomatic and water quality in the German Alps (8h, bachelor), 2021: University of Kalmar (Sweden), remote sensing to monitor the water bird flyway environments (8h, bachelor to researchers), 2021: University of Bamberg (Germany): geomatic and landscape connectivity (8h, Bachelor and Master), 2021: University of Helsinki (Finland): remote sensing to identify habitats used by declining migratory bird species, detection of small wetlands using satellite remote sensing (8h, Master students), 2019: University of Bamberg (Germany): geomatic and landscape connectivity (8h, Bachelor and Master students), 2018: University of Algarve (Portugal): remote sensing applied to landscape ecology (8h, Master and PhD students), 2016 and 2017: University of Helsinki (Finland): remote sensing for ecological restoration, geomatic for ecology (8h, Bachelor, Master, researchers and managers), 2016 and 2017: University of Würzburg (Germany), remote sensing applied to landscape ecology (8h, Master and PhD students). I taught in the NOVA joint course for Master and PhD students on Wetland ecology and management for 3.5 ECTS, Lammi Biological Station, 2-6th of September 2019. In 2022, I taught to high school and middle school students, 100 students (6 groups), food web and ecological connectivity of wetlands in the boreal forest for about 20 hours 50% in the field and 50% in the lab. I also taught one day to primary school levels (from 6 to 11 years old) the biodiversity of wetlands in 2019. I am currently developing an escape game with high school students and an interactive poster about seasonal wetland biodiversity with middle school students.

## Supervision

Master thesis (second year)

2022: Morgane Ducoin, Impact of water browning on the abundance and the diversity of aquatic invertebrates in temporary ponds and beaver ponds, scholarship ERASMUS + internship.

2020: Clarisse Blanchet, Assessment of the role of forestry practices on water color change in boreal lakes in Evo southern Finland, scholarship ERASMUS + internship, scholarship region ENVOLEO, scholar ship of the Lammi biological station.

2020: Gabriel Delaunay, Evolution of land use in the watershed of Lake Grand Lieu by satellite remote sensing in relation to the dynamic of the habitats of macro-invertebrates in the lake, OSUNA funding.

2019: Brahim Brahimi Ali Koreimy, Implementation of a multi-agent model allowing spatio-temporal simulations of the exposure of amphibian habitats to ALAN in the Dombes area, funding from IXXI.

2019: Constance Desmarres, Recent colonization of the island of Aasla (Finland) by goose populations: definition of the explanatory factors.

2019: Héloïse Bouloizeau, Impact of the interruption of grazing and its restoration on the populations of crested lapwing and passerines on the island of Aasla (Finland)

2017: Clément Merle, cartographic modeling of flood regimes from Landsat and Sentinel images, Application to the Camargue, Tour du Valat funding

2017: Océane Anty, Characterization of temporary pools in the Evo NATURA 2000 area, Funding: ERASMUS + internship, Lammi biological station .

2015: Julie Campagna, statistical models for very high spatial resolution remote sensing of wetlands. Comparison of CART and Random Forest for the mapping of habitats in the former salt marshes of the Camargue, Tour du Valat funding.

2015: Audrey Delannoy, Aquatic beds of the lagoons of the former salt marshes of the Camargue: cartography and statistics, Tour du Valat funding.

2013: Romain Stasse, a statistical model for monitoring halophilic vegetation by remote sensing, area of the former saltworks of Giraud in Camargue, Tour du Valat funding.

2013: Mahafaka Séverine Patricia RANOARISOA, monitoring of inundated areas and the state of reed beds in the Camargue using SPOT - 5 multi-temporal images, Tour du Valat funding.

2012: Mahefa Rakotoarisoa, a rain-flow model to help quantify pesticide transfers in a small wine-growing watershed, funding from the BV VITI project region.

Master thesis (first year)

2021: Morgane Ducoin, Drainage network assessment and impact on the lakes'brownification in Natura 2000 Evo zone, southern Finland, ERASMUS+ Internship.

2021: Basile Marteau, l'impact du brunissement des eaux de surface sur la coloration du Triton ponctué, *Lissotriton vulgaris* ERASMUS+ internship at EVO, Finland.

2020: Martin Lamirault, Origin and impact of browning of water in boreal lakes in Finland, Fellowship of the faculty of sciences of the University of Angers.

2020: Gwenaëlle Ninot, Impact of browning of surface water on the fish community, funding: ERASMUS + internship

2019: Clarisse Blanchet, Impact of water surface browning on boreal lake ecosystems. Funding: scholarship from the faculty of sciences of the university of Angers and Lammi biological station.

2019: Jean-Joubert Garconvil, Bibliographical study of surface water browning

2018: Margot Porteous, Development of a cartography (viewshed analysis) of the exposure of wetlands in the Dombes to direct lighting from the artificial light network

2018: Tom Lorée, Cartography of the albedo of the Dombes (a wetland area close to Lyon, France)

2017: Bastien Bit, Laure Biret, Mathilde Noblet, Evolution of habitat and invertebrates between 1990 and 20017 in three different types of lakes. Funding: scholarship from the faculty of sciences of the University of Angers, Lammi Biological Station.

2017: Marie Macé, Study of the influence of ecological parameters on the distribution of *salicornia* in the Camargue

2017: Axel Le Liard, Morphometric analysis of the plant evolution of a dune island in the Rhône delta, the contribution of fractal geometry

2015: Alexandre Bergère, Cartography and characterization of freshwater and slightly brackish marshes in the Camargue

2014: Clément Harmange, Diversity of macro-invertebrates in a small stream located in a wine-growing watershed

2014: Valentin Lehercyey, Ecological functions of small wetlands on the banks of the Layon river

PhD Coordination: Imrana Aliyu, 2019- 2023: Geo-spatial Mapping and Monitoring of the Impacts of Oil Spillage on the Niger Delta Mangroves using Microwave and Optical Satellite Imageries, funding: Petroleum Trust Development Fund (PTDF) PhD full funding scholarship, these campus France. Julie Campagna, 2015- : Predictive modeling of the evolution of a coastal area: contribution of remote sensing to understand the management and services of a changing territory; the case of the ponds and marshes of the Salins de Camargue. Co-financing of the University of Angers and the Tour du Valat research center.

Phd co-supervising: Uma Siegdal 2021-2025: Towards a sustainable management of temporary wetlands: Learning from local ecological knowledge to improve biodiversity, University of Turku. Supervisor: Céline Arzel. Clarisse Blanchet 2021-2025: Natural and anthropogenic disturbances in the boreal forest environment - Impact of forestry and beaver on browning and lake ecosystem. University of Helsinki. Supervisor: Petri Nummi. Ricardo Andriatsiaronandroy 2015-2018: Recent dynamics and evolution models of mangroves in the Toliara region (Madagascar), under the direction of Nuscia Taïbi, University of Angers and University of Toliara.

## Pedagogical training

April 2019: Management and Coordination of EC Funded Projects; the PM<sup>2</sup> Methodology, Lisbon, European Academy (2 days)  
October 2018: H2020 Proposal Writing Academy + Marie Skłodowska -Curie (ITN / ETN) proposal writing, Budapest, Europa Media (5 days)  
June 2017: MAPS 10 thematic school (Agent-based modelling for spatial phenomena) (5 days)  
May 2013: Training on e-cognition (2 days)  
June 2012: Python ARcGis (2 days)  
May 2012: Rights and Duties related to the design of digital resources Information and communication technologies (4h)  
March 2012: Creativity techniques for teaching, Personal development (6h)  
February 2012: The rules of an effective PowerPoint presentation (teachers) (4h)  
December 2011: Evaluation of learning and adaptation of tools and techniques (10h)  
December 2011: Building effective MCQs (3h30)  
October 2011: Build and animate a teaching and learning situation (6h)  
October 2011: "Your Moodle space: a landmark for students" (3h)

## Publications

**An evaluation of global LULC maps for the estimation of habitat use of a declining migratory waterbird along its flyway**  
van Toor, M. L., Davranche, A., Delaunay, G., Murgue, C., Waldenström, J. & Arzel, C., Jul 2025, In: Biological Conservation. 307, 111152.

**Pilot study on neonicotinoids in Finnish waterbirds: no detectable concentrations in common goldeneye (*Bucephala clangula*) plasma**

V. Ask, A., Gómez-Ramírez, P., Jaspers, V. L. B., Fenoll, J., Cava, J., Vakili, F., Lemesle, P., Eeva, T., Davranche, A., Koivisto, S., Hansen, M. & Arzel, C. M., 3 Oct 2024, In: Environmental Science and Pollution Research.

**Which Natural Wetland Characteristics Could be Used in Creating Temporary Wetlands?**

Nummi, M., Nummi, P., Holopainen, S., Davranche, A., Sigdel, U. & Arzel, C., Oct 2024, In: Wetlands. 44, 7, 100.

**Imagine the biodiversity of temporary wetlands in European boreal forests, a science-art pedagogical kit made by the team of the POOL project**

Davranche, A., Tuháčková-Vogel, R., Vogel, X., Vogel, V., Bänsch, A., Chapot, P.-L. & Arzel, C. M., 5 Jun 2024, Zenodo.

**A multi-sensor approach to monitor the ongoing restoration of edaphic conditions for salt marsh species facing sea level rise: An adaptive management case study in Camargue, France**

Davranche, A., Arzel, C. M., Pouzet, P., Carrasco, A. R., Lefebvre, G., Lague, D., Thibault, M., Newton, A., Fleurant, C., Maanan, M. & Poulin, B., 10 Nov 2023, In: Science of the Total Environment.

**Waterbird contamination by endocrine disruptors**

Arzel, C., Ask, A., Ciesielski, T. M., Asimakopoulos, A. G., Zhang, J., Lemesle, P., Frøyland, S. H., Lunde, E., Shahrabaki, S. V., Jolkkonen, J., Eeva, T., Björkman, S., Sonne, C., Shaffer, S., Ruuskanen, S., Öst, M., Waldenström, J., Davranche, A., Hansen, M. & Jaspers, V. L. B., 21 Aug 2023.

**Finnish breeding female ducks are contaminated by a mixture of EDCs including per- and polyfluoroalkyl substances, phthalates, benzophenones, and lead.**

Arzel, C., Ask, A., Lemesle, P., Frøyland, S. H., Jaspers, V. L. B., Hansen, M., Ciesielski, T. M., Asimakopoulos, A. G., Shahrabaki, S. V., Jolkkonen, J., Eeva, T., Björkman, S., Sonne, C., Shaffer, S., Ruuskanen, S., Koivisto, S., Öst, M., Waldenström, J. & Davranche, A., 14 Feb 2023.

**Ecology and extent of freshwater browning-What we know and what should be studied next in the context of global change**

Blanchet, C. C., Arzel, C., Davranche, A., Kahilainen, K. K., Secondi, J., Taipale, S., Lindberg, H., Loehr, J., Manninen-Johansen, S., Sundell, J., Maanan, M. & Nummi, P., 15 Mar 2022, In: Science of the Total Environment. 812, 16 p., 152420.

**Assessing the effects of artificial light at night on biodiversity across latitude - Current knowledge gaps**

Secondi, J., Davranche, A., Thery, M., Mondy, N. & Lengagne, T., Mar 2020, In: Global Ecology and Biogeography. 29, 3, p. 404-419 16 p.

Introducing WIW for Detecting the Presence of Water in Wetlands with Landsat and Sentinel Satellites  
Lefebvre, G., Davranche, A., Willm, L., Campagna, J., Redmond, L., Merle, C., Guelmami, A. & Poulin, B., Oct 2019, In: Remote Sensing. 11, 19, 18 p.

Variability of surface and underwater nocturnal spectral irradiance with the presence of clouds in urban and peri-urban wetlands  
Secondi, J., Dupont, V., Davranche, A., Mondy, N., Lengagne, T. & Thery, M., 8 Nov 2017, In: PLoS One. 12, 11, 13 p.

Vegetation maps based on remote sensing are informative predictors of habitat selection of grassland birds across a wetness gradient  
Besnard, A. G., Davranche, A., Maugenest, S., Bouzillé, J. B., Vian, A. & Secondi, J., 8 Jun 2015, In: Ecological Indicators. 58, p. 47-54 8 p.

Mapping flooding regimes in Camargue wetlands using seasonal multispectral data  
Davranche, A., Poulin, B. & Lefebvre, G., Nov 2013, In: Remote Sensing of Environment. 138, p. 165-171 7 p.

Ecological assessment of *Phragmites australis* wetlands using multi-season SPOT-5 scenes  
Poulin, B., Davranche, A. & Lefebvre, G., 15 Jul 2010, In: Remote Sensing of Environment. 114, 7, p. 1602-1609 8 p.

Wetland monitoring using classification trees and SPOT-5 seasonal time series  
Davranche, A., Lefebvre, G. & Poulin, B., 15 Mar 2010, In: Remote Sensing of Environment. 114, 3, p. 552-562 11 p.

Radiometric Normalization of SPOT-5 Scenes: 6S Atmospheric Model versus Pseudo-invariant Features  
Davranche, A., Lefebvre, G. & Poulin, B., Jun 2009, In: Photogrammetric Engineering and Remote Sensing. 75, 6, p. 723-728 6 p.

## **Activities**

### **GEOBON 2023**

Davranche, A. (Speaker)  
10 Oct 2023

### **Poster Integrating ephemeral wetlands in the sustainable management of boreal forests: an innovative biodiversity assessment of unknown vulnerable ecosystems from space to field supported by art for public involvement**

Davranche, A. (Participant), Blanchet, C. (Participant), Nummi, P. (Participant), Secondi, J. (Participant), Lindberg, H. (Participant), Vasander, H. (Participant), Loehr, J. (Participant), Sundell, J. (Participant) & Arzel, C. (Participant)  
10 Oct 2023 → 13 Oct 2023

### **Ephemeral wetlands in Evo forests**

Davranche, A. (New classification), Arzel, C. (New classification) & Tuháčková-Vogel, R. (New classification)  
27 Aug 2023 → 31 Aug 2023

### **Monitoring biophysical parameters of wetlands using multispectral drone data**

Davranche, A. (Speaker)  
15 Feb 2023 → 16 Feb 2023