

Jean-Olivier IRISSON

Maître de Conférences (Associate professor)
Sorbonne Université
Laboratoire d’Océanographie de Villefranche
2 Quai de la Corderie, 06230 Villefranche-sur-Mer
Tel: +33 4 93 76 38 04, Mob: +33 6 21 05 19 90
irisson@normalesup.org
<http://www.obs-vlfr.fr/irisson/>



I am a computational ecologist, which means that I combine data, algorithms, and software implementations on computers to tackle ecological questions. I work on marine ecosystems where I study the dynamics, distribution, and traits of the free-floating organisms that constitute plankton.

1 Curriculum

- 2020 Habilitation à Diriger des Recherches: *Towards a computational ecology of plankton.*
- 2010 - Maître de Conférences (Associate Professor) at Sorbonne Université
- 2009 - 2010 Attaché Temporaire d’Éducation et de Recherche (ATER; Assistant Professor) at Université Pierre et Marie Curie (UPMC, now Sorbonne Université)
- 2008 - 2009 Post Doctoral fellow at RSMAS, University of Miami, USA
- 2004 - 2008 PhD, Ecology and Oceanography at EPHE/University of Perpignan, France: *Behavioural approach to larval dispersal in marine systems*, magna cum laude
- 2003 - 2004 “Agrégation” in Life and Earth Sciences, speciality in organisms and population biology, rank 10/2500
- 2001 - 2003 MSc, Ecology at UPMC and École Normale Supérieure (ENS), France
- 2000 - 2001 École Normale Supérieure, rue d’Ulm, rank 14/2000

2 Research

2.1 Main projects

NB: The titles, budget, and description are restricted to the work-packages/tasks which I specifically contribute to.

- 2023 - 2026 **FORMAL “From observing to modelling ocean life” (Sorbonne Université, Fr; 500k€, coPI).** Bring together oceanographers and applied mathematicians to foster improved use of data and models of the marine environment. Involves six kinds of data (omics, imaging, biologging, acoustics, biogeochemical profiles, satellite images), four types of models (biogeochemical, niche, interaction, lagrangian), and leverages machine learning techniques for data processing, analysis, assimilation into models.

Blue-Cloud 2026 “A federated European FAIR and Open Research Ecosystem for oceans, seas, coastal and inland waters”: (Horizon EU; 360k€, PI for Sorbonne Université). Integrate plankton imagery data as a FAIR data source into international data infrastructure; leverage these infrastructures and cloud computing to define operational species distribution modelling pipeline and map biodiversity

at global scale.

DTO-Bioflow, WP3 “Enabling sustained flows of biodiversity monitoring data into the DTO”: (Horizon EU; 445k€, PI for Sorbonne Université). Define and implement automated flows of data from plankton imagery instruments to the Digital Twin of the Ocean. Exploit this data to better constrain carbon flux at global scale.

ANERIS “operAtional seNsing lifE technologies for maRIne ecosystemS” WP3 Imagery (Horizon EU; 170k€, participant). Deploy imaging instruments on moored platforms and process their data on-the-fly to study high frequency changes in marine plankton ecosystems.

BiOcean5D, WP3 “Data to knowledge, a digital foundation for holistic marine biodiversity assessment” (Horizon EU; 250k€, task PI). Study biodiversity along coast to offshore gradients along the coast of Europe through the Tara Europa cruise, in association with the coastal TREC sampling campaign of EMBL. Beyond scientific exploitation of the data, my role is also to ensure the proper flow of plankton imagery data towards international databases.

2022 - 2028 FUTUREOBS “Observatoire augmenté pour les socio-écosystèmes côtiers” (PPR Océans, Fr; 100k€, participant). Integrate new ocean monitoring approaches (based on meta-omics and imagery) into the existing framework of French coastal monitoring systems. Our contribution is mostly around best practices, standards and training in plankton imagery.

2022 - 2026 Smart-Biodiv “Smart AI technologies for Biodiversity Research” (ANR, Fr; 88k€, PI for LOV). Derive improved or new biodiversity indicators from existing biological data, using Artificial Intelligence techniques. Our contribution is more targeted towards providing (i) plankton imagery data from time series in the Mediterranean Sea and cruises in the Pacific and (ii) expertise regarding the ecological processes associated.

TraitZoo “Trait biogeography and functional diversity of marine mesozooplankton” (ANR, Fr; 134k€, PI for LOV). Extract traits (size, pigment concentration, reproduction potential, energy reserves) from images of plankton and use this data to describe the biogeography and functional implications of those traits.

2022 - 2025 iMagine “Imaging data and services for aquatic science” (Horizon EU; 360k€, PI for Sorbonne Université). Develop a new version of the image processing pipeline for the ZooScan instrument, using artificial intelligence; release this as a cloud service; leverage it to process a 50 years long time series of plankton imagery data and analyse it to detect potential effects of climate change.

PSSdb “A Pelagic Size Structure database” (NOAA, US; 145k€, participant). Contribute to assembling a global database of concentrations of plankton and marine snow particles, organised per size class, from various imaging instruments, to calibrate carbon flux estimates in numerical models.

PopNCo, WP5 “Data integration and synthesis” (ANR, Fr; 130k€, WP PI). Assess the spatio-temporal variability of connectivity between biological populations from genetic and modelling data, through graph-based approaches.

2022 - 2023 LOVNOWER “Machine learning and computer vision for plankton imagery” (Plan Relance, Fr; 220k€, PI). Partnership with a computer vision startup to develop machine learning-based tools for classification and visual search in the EcoTaxa plankton imagery platform.

- 2021 - 2023 TechOceanS, Theme 2 “Imaging and optics” (H2020, EU; 300k€, participant). Investigate image compression through auto-encoders and unsupervised image selection for optimal use of low-bandwidth transmission from autonomous in situ plankton imagers.
- JERICO-S3, Tasks 6.3.1 “Biological imagery data” and 7.5 “JERICO infrastructure” (H2020, EU; 62k€, task PI). Define international standards for quantitative imagery of plankton, implement those standards in data processing pipelines from several instruments, provide access to an infrastructure hosting the resulting data.
- 2020 - 2024 AtlantECO (H2020, EU; 300k€, participant). Make a census of and map biodiversity and biology-driven carbon flux in the Atlantic Ocean through traditional and novel tools (genomics, imagery).
- 2019 - 2023 **WWWPIC World Wide Web of Plankton Image Curation (Belmont Forum; 1M€, PI)**. Setup an international infrastructure for the classification of plankton images assisted by machine learning and the sharing of the resulting datasets; use this infrastructure to tackle questions about the distribution of plankton from the mesoscale to the global ocean.
- 2019 - 2023 BlueCloud, Task 2.3 “Plankton demonstrator” (H2020, EU; 250k€, PI for Sorbonne Université). Use genomics and images jointly to infer new species and functions for unassigned genomic reads from plankton samples; then predict the geographical distribution of these plankton groups, traits, and functions.
- 2019 - 2021 **ARTIFACTZ “Application de l’intelligence artificielle à l’identification de traits fonctionnels à partir d’images à haute résolution” (Sentinelle-Nord; 40k€, coPI)**. Use artificial intelligence to extract ecological traits from plankton images.
- CARDINAL “Calanus redness index from artificial intelligence: applications to image analysis” (Sentinelle-Nord, The Arctic University of Norway; 154k€, participant). Quantify redness of individual Calanus copepods from images and relate it to redness of surface waters seen from satellites.
- 2019 **EMODnet Biology Data Grant “Plankton Imaging Data” (EU; 20k€ PI)**. Use the EcoTaxa imagery management platform to send large datasets of plankton concentrations at various locations and dates around the world; in total, over 4M occurrences were reported.
- 2017 - 2018 **DL-PIC “Deep Learning for Plankton Image Classification” (CNRS; 23k€, PI)**. Use dedicated Convolutional Neural Networks for plankton images classification.
- 2015 - 2019 BRIDGES, Task “Underwater Vision Profiler version 6” (H2020, EU; 450k€, participant). Develop an intelligent plankton camera for autonomous instruments; I lead the machine learning developments for onboard classification of images.
- 2013 - 2015 PERSEUS, Task 1.6 “Ecoregionalisation” (H2020, EU; 100k€, task PI). Use ecological niche modelling and multivariate clustering to define homogeneous regions within the Mediterranean Sea.
- 2012 - 2016 **Biophysical interactions at mesoscale in the ocean (PUF; 240k\$, PI)**. Designed and run this research, innovation, and education program, with the University of Miami. The program funded three research actions (dealing with plankton and fish larvae), the evolution of two instruments, and directly involved 12 professors and 26 students. <http://puf.rsmas.obs-vlfr.fr>
- 2011 - 2016 MERMEX, WP5 “Marine regionalisation planning” (CNRS; 60k€, WP PI). Coordinated the data consolidation and valorisation activities of this structuring pro-

gram; this involved biogeography studies as well as joint research with environmental economists.

2011 - 2014 Biogeographic atlas of the Southern Ocean (SCAR; participant) Lead the ecological niche modelling efforts, in particular for krill and fishes.

2.2 Peer-reviewed publications

- Current Fabri-Ruiz S, Berdalet E, Ulses C, Somot S, Vila M, Lemée R, **Irisson J-O**. Harmful *Ostreopsis cf. ovata* blooms could extend in time span with climate change in the Western Mediterranean Sea. To be submitted to *Ecography*.
- Panaïotis T, Poteau A, Diamond-Riquier E, Catalano C, Courchet L, Motreuil S, Coppola L, Picheral M, **Irisson J-O**. Temporal evolution of plankton and particles distribution across a mesoscale front during the spring bloom. Accepted in *Limnology & Oceanography*.
- Panaïotis T, Amblard E, Boniface-Chang G, Dulac-Arnold G, Woodward B, **Irisson J-O**. Benchmark of plankton images classification approaches: feature quality matters more than classifier complexity. To be submitted to *Limnology & Oceanography: Methods*.
- Panaïotis T, Biard T, Caray-Counil L, Faillettaz R, Luo JY, Guigand CM, Cowen RK, **Irisson J-O**. High throughput in situ imaging reveals complex ecological behavior of giant marine mixotrophic protists. To be submitted to *PNAS*.
- Schickele A, Debeljak P, Ayata S-D, Bittner L, Pelletier E, Guidi L, **Irisson J-O**. Exploring the functional biogeography of photosynthesis in picoeukaryotes. Preprint, in review in *Science Advances*.
- 2023 Beck M, Cailleton C, Guidi L, Desnos C, Jalabert L, Elineau A, Stemmann L, Ayata S-D, **Irisson J-O**. Morphological diversity increases with decreasing resources along a zooplankton time series. *Proceedings of the Royal Society B: Biological Sciences* 290:20232109.
- Dugenne M, Corrales-Ugalde M, Luo J, Kiko R, O'Brien T, **Irisson J-O**, Lombard F, Stemmann L, Stock C, Anderson CR. First release of the Pelagic Size Structure database: Global datasets of marine size spectra obtained from plankton imaging devices. *Earth System Science Data* 2023:1–41.
- Fabri-Ruiz S, Baudena A, Moullec F, Lombard F, **Irisson J-O**, Pedrotti ML. Mistaking plastic for zooplankton: Risk assessment of plastic ingestion in the Mediterranean sea. *Science of The Total Environment* 856:159011.
- Panaïotis T, Babin M, Biard T, Carlotti F, Coppola L, Guidi L, Hauss H, Karp-Boss L, Kiko R, Lombard F, McDonnell AMP, Picheral M, Rogge A, Waite AM, Stemmann L, **Irisson J-O**. Three major mesoplanktonic communities resolved by in situ imaging in the upper 500 m of the global ocean. *Global Ecology and Biogeography* 32:1991–2005.
- Rubbens P, [...], Malde K, **Irisson J-O** (2023) Machine learning in marine ecology: an overview of techniques and applications. *ICES Journal of Marine Science* fsad100.
- 2022 Berenshtein I, Faillettaz R, **Irisson J-O**, Kiflawi M, Siebeck UE, Leis JM, Paris CB. Evidence for a consistent use of external cues by marine fish larvae for orientation. *Communications Biology* 5:1–9.

- Drago L, Panaïotis T, **Irisson J-O**, Babin M, Biard T, Carlotti F, Coppola L, Guidi L, Hauss H, Karp-Boss L, Lombard F, McDonnell AMP, Picheral M, Rogge A, Waite AM, Stemann L, Kiko R. Global Distribution of Zooplankton Biomass Estimated by In Situ Imaging and Machine Learning. *Frontiers in Marine Science* 9.
- Dubois C, **Irisson J-O**, Debreuve E. Correcting estimations of copepod volume from two-dimensional images. *Limnology and Oceanography: Methods* 20:361–371.
- Feuilloley G, Fromentin J-M, Saraux C, **Irisson J-O**, Jalabert L, Stemann L. Temporal fluctuations in zooplankton size, abundance, and taxonomic composition since 1995 in the North Western Mediterranean Sea. *ICES Journal of Marine Science* 79:882–900.
- Irisson J-O**, Ayata S-D, Lindsay DJ, Karp-Boss L, Stemann L. Machine Learning for the Study of Plankton and Marine Snow from Images. *Annual Review of Marine Science* 14:277-301.
- Kiko R, [...], **Irisson J-O**, [...], Stemann L. A global marine particle size distribution dataset obtained with the Underwater Vision Profiler 5. *Earth System Science Data* 14(9):4315-4337.
- Orenstein EC, Ayata S-D, Maps F, [...], **Irisson J-O**. Machine learning techniques to characterize functional traits of plankton from image data. *Limnology and Oceanography* 67:1647–1669.
- Panaïotis T, Caray–Council L, Woodward B, Schmid MS, Daprano D, Tsai ST, Sullivan CM, Cowen RK, **Irisson J-O**. Content-Aware Segmentation of Objects Spanning a Large Size Range: Application to Plankton Images. *Frontiers in Marine Science* 9.
- Picheral M, Catalano C, Brousseau D, Claustre H, Coppola L, Leymarie E, Coindat J, Dias F, Fevre S, Guidi L, **Irisson J-O**, Legendre L, Lombard F, Mortier L, Penkerch C, Rogge A, Schmechtig C, Thibault S, Tixier T, Waite A, Stemann L. The Underwater Vision Profiler 6: an imaging sensor of particle size spectra and plankton, for autonomous and cabled platforms. *Limnology and Oceanography: Methods* 20:115–129.
- Pierella Karlusich JJ, Lombard F, **Irisson J-O**, Bowler C, Foster RA. Coupling Imaging and Omics in Plankton Surveys: State-of-the-Art, Challenges, and Future Directions. *Frontiers in Marine Science* 9.
- Soviadan YD, Benedetti F, Brandão MC, Ayata S-D, **Irisson J-O**, Jamet J-L, Kiko R, Lombard F, Gnanadi K, Stemann L. Patterns of mesozooplankton community composition and vertical fluxes in the global ocean. *Progress in Oceanography* 200:102717.
- 2021 Brandão MC, Benedetti F, Martini S, Soviadan YD, **Irisson J-O**, Romagnan J-B, Elineau A, Desnos C, Jalabert L, Freire AS, Picheral M, Guidi L, Gorsky G, Bowler C, Karp-Boss L, Henry N, de Vargas C, Sullivan MB, Stemann L, Lombard F. Macroscale patterns of oceanic zooplankton composition and size structure. *Scientific Reports* 11:15714.
- Feuilloley G, Fromentin J-M, Saraux C, **Irisson J-O**, Jalabert L, Stemann L. Temporal fluctuations in zooplankton size, abundance and taxonomic composition since 1995 in the North Western Mediterranean Sea. *ICES Journal of Marine Science*, fsab190.
- Gazeau F, Ridame C, Van Wambeke F, Alliouane S, Stolpe C, **Irisson J-O**, Marro S, Grisoni J-M, De Liège G, Nunige S. Impact of dust addition on Mediterranean

- plankton communities under present and future conditions of pH and temperature: an experimental overview. *Biogeosciences* 18:5011–5034.
- Trudnowska E, Lacour L, Ardyna M, Rogge A, **Irisson JO**, Waite AM, Stemmann L. Marine snow morphology illuminates the evolution of phytoplankton blooms and determines their subsequent vertical export. *Nature Communications* 12, 2816.
- Vilgrain L, Maps F, Picheral M, Babin M, Aubry C, **Irisson J-O**, Ayata S-D. Trait-based approach using in situ copepod images reveals contrasting ecological patterns across an Arctic ice melt zone. *Limnology and Oceanography* 66:1155–1167.
- 2020 Faillettaz R, Voué R, Crec’hriou R, Garsi L-H, Lecaillon G, Agostini S, Lenfant P, **Irisson J-O**. Spatio-temporal patterns of larval fish settlement in the northwestern Mediterranean Sea. *Marine Ecology Progress Series*, 650:153-173.
- Giering SLC, Cavan EL, Basedow SL, Briggs N, Burd AB, Darroch LJ, Guidi L, **Irisson J-O**, Iversen MH, Kiko R, Lindsay D, Marcolin CR, McDonnell AMP, Möller KO, Passow U, Thomalla S, Trull TW, Waite AM (2020) Sinking Organic Particles in the Ocean—Flux Estimates From in situ Optical Devices. *Frontiers in Marine Science* 6.
- 2019 Benedetti F, Ayata S, **Irisson J-O**, Adloff F, Guilhaumon F. Climate change may have minor impact on zooplankton functional diversity in the mediterranean sea. *Diversity and Distributions*, 25(4):568-581
- Benedetti F, Jalabert L, Sourisseau M, Beker B, Cailliau C, Desnos C, Elineau A, **Irisson J-O**, Lombard F, Picheral M, Stemmann L, Pouline P. The seasonal and inter-annual fluctuations of plankton abundance and community structure in a North Atlantic Marine Protected Area. *Frontiers in Marine Science*, 6:214
- Lombard F, [...], **Irisson J-O**, [...] (Consortium paper). Globally consistent quantitative observations of planktonic ecosystems. *Frontiers in Marine Science* 6.
- Rossi A, **Irisson J-O**, Levaray M, Pasqualini V, Agostini S. Orientation of mediterranean fish larvae varies with location. *Marine Biology*, 166(8):100
- Schröder S, Kiko R, **Irisson J-O**, Koch R. Low-shot learning of plankton categories. GCPR 2018, *Lecture Notes in Computer Science*, vol 11269
- 2018 Ayata S*, **Irisson J-O***, Berline L, Dutay J, Mayot N, Nieblas A, D’Ortenzio F, Palmiéri J, Reygondeau G, Rossi V, Guieu C. Regionalisation of the mediterranean basin, a MERMEX synthesis. Special issue of *Progress in Oceanography*, 163:7-20. *: co first-author
- Faillettaz R, Durand E, Paris CB, Koubbi P, **Irisson J-O**. Swimming speeds of mediterranean settlement-stage fish larvae nuance Hjort’s aberrant drift hypothesis. *Limnology and Oceanography*, 63(2):509-523
- Faillettaz R, Gilletta L, Petit F, Francour P, **Irisson J-O**. First records of dusky grouper *Epinephelus marginatus* settlement-stage larvae in the Ligurian Sea. *Journal of Oceanography, Research and Data*, 10(1)
- Faillettaz R, Paris CB, **Irisson J-O**. Larval fish swimming behavior alters dispersal patterns from marine protected areas in the north-western mediterranean sea. *Frontiers in Marine Science*, 5:97
- Gattuso J, Magnan AK, Bopp L, Cheung WWL, Duarte CM, Hinkel J, Mcleod E, Micheli F, Oschlies A, Williamson P, Billé R, Chalastani V, Gates RD, **Irisson J-O**, Middelburg JJ, Poertner HO, Rau G. Ocean solutions to address climate change and its effects on marine ecosystems. *Frontiers in Marine Science*, 5:337

- Luo JY, **Irisson J-O**, Graham B, Guigand C, Sarafraz A, Mader C, Cowen RK. Automatic plankton image analysis using convolutional neural networks. *Limnology and Oceanography: Methods*, 16(12):814-827
- 2017 Reygondeau G, Guieu C, Benedetti F, **Irisson J-O**, Ayata S, Gasparini S, Koubbi P. Biogeochemical regions of the mediterranean sea: an objective multidimensional and multivariate environmental approach. *Progress in Oceanography*, 151:138-148
- Chust G, et al. Mare incognitum: a glimpse into future plankton diversity and ecology research. *Frontiers in Marine Science*, 4(8)
- Jean M, **Irisson J-O**, Gras G, Bouchand F, Simo D, Duran C, Perronne C, Mulleman D, Bernard L, Dinh A. Diagnostic delay of pyogenic vertebral osteomyelitis and its associated factors. *Scandinavian Journal of Rheumatology*, 46(1):64-68
- 2016 Ezzat L, Towle E, **Irisson J-O**, Langdon C, Ferrier-Pagès C. The relationship between heterotrophic feeding and inorganic nutrient availability in the scleractinian coral *T. reniformis* under a short-term temperature increase. *Limnology and Oceanography*, 61(1):89-102
- Faillettaz R, Picheral M, Luo JY, Guigand C, Cowen RK, **Irisson J-O**. Imperfect automatic image classification successfully describes plankton distribution patterns. *Methods in Oceanography*, 15-16:60-77
- 2015 Howes EL, Stemmann L, Assailly C, **Irisson J-O**, Dima M, Bijma J, Gattuso J. Pteropod time series from the north western mediterranean (1967-2003): impacts of pH and climate variability. *Marine Ecology Progress Series*, 531:193-206
- Crise A, et al. A MSFD complementary approach for the assessment of pressures, knowledge and data gaps in Southern European Seas: the PERSEUS experience. *Marine Pollution Bulletin*, 95(1):28-39
- Sukhovich A, Bonnieux S, Hello Y, **Irisson J-O**, Simons FJ, Nolet G. Seismic monitoring in the oceans by autonomous floats. *Nature Communications*, 6:8027
- Irisson J-O**, Paris CB, Leis JM, Yerman MN. With a little help from my friends: group orientation by larvae of a coral reef fish. *PLoS ONE*, 10(12):e0144060
- Faillettaz R, Blandin A, Paris CB, Koubbi P, **Irisson J-O**. Sun-compass orientation in mediterranean fish larvae. *PLoS ONE*, 10(8):e0135213
- 2014 Cuzin-Roudy J, **Irisson J-O**, Penot F, Kawaguchi S, Vallet C. Chapter 6.9 Southern Ocean Euphausiids. In: *Biogeographic Atlas of the Southern Ocean*, De Broyer C, Koubbi P, Griffiths HJ, Raymond B, Udekem d'Acoz C, et al (eds). Scientific Committee on Antarctic Research, pp 309-320
- Duhamel G, Hulley P, Causse R, Koubbi P, Vacchi M, Pruvost P, Vigetta S, **Irisson J-O**, Mormede S, Belchier M, Dettai A, Detrich HW, Gutt J, Jones CD, Kock K, Lopez Abellan LJ, Van de Putte A. Chapter 7 Biogeographic patterns of fish. In: *Biogeographic Atlas of the Southern Ocean*, De Broyer C, Koubbi P, Griffiths HJ, Raymond B, Udekem d'Acoz C, et al (eds). Scientific Committee on Antarctic Research, pp 328-362
- Leis J, Paris CB, **Irisson J-O**, Yerman M, Siebeck U. Orientation of fish larvae in situ is consistent among locations, years and methods, but varies with time of day. *Marine Ecology Progress Series* 505:193-208
- Luo J, Grassian B, Tang D, **Irisson J-O**, Greer A, Guigand C, McClatchie S, Cowen R. Environmental drivers of the fine-scale distribution of a gelatinous zooplankton community across a mesoscale front. *Marine Ecology Progress Series* 510:129-149

- Mormède S, **Irisson J-O**, Raymond B. Chapter 2.3 Distribution modelling. In: *Biogeographic Atlas of the Southern Ocean*, De Broyer C, Koubbi P, Griffiths HJ, Raymond B, Udekem d'Acoz C, et al (eds). Scientific Committee on Antarctic Research, pp 27-29
- Sukhovich A*, **Irisson J-O***, Perrot J, Nolet G. Automatic recognition of T and teleseismic P waves by statistical analysis of their spectra: An application to continuous records of moored hydrophones. *Journal of Geophysical Research: Solid Earth* 119(8):6469-6485. *: co first-author
- 2013 Giraldo C, Mayzaud P, Tavernier E, **Irisson J-O**, Penot F, Becciu J, Chartier A, Boutoute M, Koubbi P. Lipid components as a measure of nutritional condition in fish larvae (*Pleuragramma antarcticum*) in East Antarctica. *Marine Biology* 160:877-887
- Paris CB, Atema J, **Irisson J-O**, Kingsford M, Gerlach G, Guigand C. Reef Odor: A Wake Up Call for Navigation in Reef Fish Larvae. *PLoS ONE* 8(8):e72808
- Talec A, Philistin M, Ferey F, Walenta G, **Irisson J-O**, Bernard O, Sciandra A (2013) Effect of gaseous cement industry effluents on four species of microalgae. *Biore-source Technology* 143:353-35
- 2011 Sukhovich A, **Irisson J-O**, Simons FJ, Ogé A, Hello Y, Deschamps A, Nolet G. Automatic discrimination of underwater acoustic signals generated by teleseismic P-waves: A probabilistic approach. *Geophysical Research Letters*, 38(L18605)
- 2010 Hubert N, Delrieu-Trottin E, **Irisson J-O**, Meyer C, Planes S. Identifying coral reef fish larvae through DNA barcoding: a test case with the families Acanthuridae and Holocentridae. *Molecular Phylogenetics and Evolution* 55(3):1195-203
- Irisson J-O**, Paris CB, Guigand C, Planes S. Ontogenetic vertical "migration" in fish larvae: description and consequences for dispersal. *Limnology & Oceanography* 55(2):909-919
- Lett C, Ayata S, Huret M, **Irisson J-O**. Biophysical modelling to investigate the effects of climate change on marine populations dispersal and connectivity. Special issue of *Progress in Oceanography* 87:106-112
- 2009 **Irisson J-O**, Guigand C, Paris CB. Detection and quantification of marine larvae orientation in the pelagic environment. *Limnology & Oceanography: Methods* 7:664-672
- Irisson J-O**, Leis JM, Paris CB, Browman H. Biological processes: behavior and settlement. In: *Manual of Recommended Practices for Modelling Physical-Biological Interactions in Fish Early-Life History*, North E, Gallego A, Petigas P (eds). ICES Cooperative Research Reports, 295:42-59
- Paris CB, **Irisson J-O**, Lacroix G, Fiksen Ø, Leis JM, Mullon C. Application 2: Connectivity. In: *Manual of Recommended Practices for Modelling Physical-Biological Interactions in Fish Early-Life History*, North E, Gallego A, Petigas P (eds). ICES Cooperative Research Reports, 295:63-76
- 2008 Paris CB, Guigand CM, **Irisson J-O**, Fisher R, D'Alessandro E. Orientation with no frame of reference (ownfor): a novel system to observe and quantify orientation in reef fish larvae. In: *Caribbean connectivity: implications for marine protected area management*, Grober-Dunsmore R and Keller DB (eds). Marine Sanctuaries Conservation Series ONMS-08-07:52-62
- Irisson J-O**, Lecchini D. In situ observation of settlement behaviour in larvae of coral reef fishes at night. *Journal of Fish Biology* 72, 2707-2713

- 2004 **Irisson J-O**, Levan A, de Lara M, Planes S. Strategies and trajectories of coral reef fish larvae optimizing self-recruitment. *Journal of Theoretical Biology* 227, 205–218
- 2003 Dercole F, **Irisson J-O**, Rinaldi S. Bifurcation analysis of a prey-predator coevolution model. *SIAM Journal on Applied Mathematics* 63:4, 1378–1391

2.3 Conferences

I contributed to 71 conference presentations and 12 posters. I list here only the ones I personally presented or directly supervised.

- 2023 Beck M, Guidi L, Stemmann L, Ayata S-D, **Irisson J-O**. Morphological diversity increases with decreasing resources along a zooplankton time series. In *ASLO Aquatic Sciences Meeting*. Palma de Mallorca, Spain
- Panaiotis T, Biard T, Carray–Counil L, Faillettaz R, Luo JY, Guigand CM, Cowen RK, **Irisson J-O**. High throughput in situ imaging reveals complex ecological behaviour of giant mixotrophic protists. In *ASLO Aquatic Sciences Meeting*. Palma de Mallorca, Spain
- Panaiotis T, Poteau A, Diamond-Riquier E, Courchet L, Motreuil S, Catalano C, Coppola L, Picheral M, **Irisson J-O** (2023b) Temporal evolution of particles and plankton distributions across a mesoscale front during the spring bloom. In *ASLO Aquatic Sciences Meeting*. Palma de Mallorca, Spain
- Picheral M, Catalano C, Accardo A, Baudena A, Claustre H, Courchet L, Drago L, Elineau A, Guidi L, **Irisson J-O** (2023) Resolving the scales of plankton ecology and biogeochemical fluxes with the Underwater Vision Profiler. In *ASLO Aquatic Sciences Meeting*. Palma de Mallorca, Spain
- 2022 Beck M, Ayata S-D, Picheral M, Lombard F, Kiko R, Stemmann L, Guidi L, **Irisson J-O**. A pipeline for in-situ plankton imaging data: Improving our understanding of ocean particle distribution and carbon fluxes using morphological traits. In *SFEcologie 2022*. Metz, France
- Beck M, Cailleton C, Guidi L, Stemmann L, Ayata S-D, **Irisson J-O**. Morphological diversity increases with oligotrophy along a zooplankton time series. In: *Marine Imaging Workshop*. Brest, France
- Dubois C, **Irisson J-O**, Debreuve E. Easily Interpretable, Non-parametric Sample Transformation for Classification. In: *Colloque GRETSI (Groupe de Recherche et d'Etudes de Traitement du Signal et des Images)*. Nancy, France
- Irisson J-O**. Observing plankton in the open ocean with quantitative imaging. In: *Sustainability Research and Innovation Congress*. Pretoria, South Africa
- Irisson J-O**, COMPLEx team. Machine learning for plankton and particles images: from pictures to data. In: *Imaginology*. Lyon, France
- Irisson J-O**, Salinas L, Colin S, COMPLEx team, Picheral M. EcoTaxa: a tool to support the taxonomic classification of large datasets through supervised machine learning. In: *SFEcologie 2022*. Metz, France
- 2021 Drago L, Panaiotis T, **Irisson J-O**, Babin M, Biard T, Carlotti F, Coppola L, Guidi L, Hauss H, Karp-Boss L, Lombard F, McDonnell AMP, Picheral M, Rogge A, Waite AM, Kiko R, Stemmann L. Imaged-based analysis of the global distribution of zooplankton biomass through a habitat modelling approach. In *Aquatic Sciences Meeting*, remote.
- Dubois C, **Irisson J-O**, Debreuve É. Correction of the estimation of the volume of copepods from 2-dimensional in situ images. In *Aquatic Sciences Meeting*, remote.

- Orenstein EC, Maps F, Ayata S-D, **Irisson J-O**. Exploring and exploiting new tools for functional trait extraction from in situ plankton images. In *Aquatic Sciences Meeting*, remote.
- Panaiotis T, Boniface-Chang G, Dulac-Arnold G, Blanc B, Biard T, Caray-Couil L, Desnos C, Elineau A, Jalabert L, Kiko R, Lombard F, Picheral M, Romagnan J-B, Stemmann L, **Irisson J-O**. Benchmark of image classification using several large plankton datasets: Convolutional Neural Networks improve detection of rare taxa. In *Aquatic Sciences Meeting*, remote.
- 2020 **Irisson J-O**, Cailleton C, Desnos C, Jalabert L, Elineau A, Stemmann L, Ayata S-D. Morphological diversity increases with oligotrophy along a zooplankton time series. In *Ocean Sciences Meeting*. San Diego, California, USA
- Panaiotis T, Babin M, Biard T, Carlotti F, Coppola L, Guidi L, Hauss H, Karp-Boss L, Kiko R, Lombard F, McDonnell AMP, Picheral M, Rogge A, Waite AM, **Irisson J-O**, Stemmann L. Typology of plankton communities seen by in situ imaging, from the epi to the mesopelagic layers of the global ocean. In *Ocean Sciences Meeting*. San Diego, California, USA
- Vilgrain L, **Irisson J-O**, Ayata S-D, Picheral M, Babin M, Maps F (2020) Morphological traits of zooplankton reveal ecological patterns along ice melt dynamics in the Arctic. In *Ocean Sciences Meeting*. San Diego, California, USA
- 2019 Faillettaz R, Paris CB, Durand E, Blandin A, Koubbi P, **Irisson J-O**. Larval fish behavior nuances Hjort's aberrant drift hypothesis. In *Larval Fish Conference*. Palma de Mallorca, Spain
- Faillettaz R, Voué R, Crec'hriou R, Garsi L-H, Lecaillon G, Agostini S, Lenfant P, **Irisson J-O**. Spatio-temporal patterns of larval fish settlement in the North-western Mediterranean Sea. Poster in *Larval Fish Conference*. Palma de Mallorca, Spain
- Paris CB, Faillettaz R, Blandin A, Koubbi P, **Irisson J-O**. Sun-compass orientation in Mediterranean fish larvae. Poster in *Larval Fish Conference*. Palma de Mallorca, Spain
- 2018 Cailleton C, Desnos C, Jalabert L, Elineau A, Stemmann L, Ayata S-D, **Irisson J-O**. Morphological diversity increases with oligotrophy along a zooplankton time series. In *SFEcologie 2018*. Rennes, France
- Faillettaz R, Paris CB, **Irisson J-O**. Larval fish swimming behavior alters dispersal patterns from marine protected areas in the North-Western Mediterranean Sea. In *Larval Fish Conference*. Victoria, British Columbia, Canada
- 2016 Faillettaz R, Durand E, Paris CB, Koubbi P, **Irisson J-O**. Swimming speeds of Mediterranean settlement-stage fish larvae nuance Hjort's aberrant drift hypothesis. In *SFEcologie 2016*. Marseille, France
- 2015 Faillettaz R, Blandin A, Durand E, Paris CB, **Irisson J-O**. Behaviour versus oceanic currents during the dispersal of larval fish in the Northwestern Mediterranean sea. In *Aquatic Sciences Meeting*. Granada, Spain
- Irisson J-O, Faillettaz R, Luo JY, Guigand CM, Cowen RK. Fine-scale distribution of zooplankton over a mesoscale front explored through high frequency imaging. In *Aquatic Sciences Meeting*. Granada, Spain
- 2014 Faillettaz R, Luo JY, Guigand CM, Cowen RK, **Irisson J-O**. Fine-scale distribution of larval fish and zooplankton over a mesoscale front explored through high frequency imaging. In *Ocean Sciences Meeting*. Honolulu, HI, USA

- Reygondeau G, Albouy C, Hattab T, Benedetti F, **Irisson J-O**, Ayata S-D, Gasparini S, McKenzie C, Koubbi P. Mediterranean biodiversity (from phytoplankton to top predators) and present threats. In *ICES*. A Coruña, Spain
- Reygondeau G, **Irisson J-O**, Albouy C, Ayata S-D, Benedetti F, Guieu C, Gasparini S, Koubbi P (2014b) Ecological geography of the Mediterranean Sea. In *IMBER*. Bergen, Norway
- 2013 **Irisson J-O**. Autoplot: ready made plots with ggplot2. In *Rencontres R*. Lyon, France
- Faillettaz R, **Irisson J-O**. Drivers of temporal variability of larval fish abundance in villefranche bay (Northwestern Mediterranean Sea) over a 7-year time series (2006-2012). In *Larval Fish Conference*. Miami, FL, USA.
- Reygondeau G, **Irisson J-O**, Albouy C, Ayata S-D, Benedetti F, Guieu C, Gasparini S, Koubbi P. Ecoregionalisation of the Mediterranean Sea. Poster in *CIESM*. Marseille, France
- 2012 **Irisson J-O**, Webb A, Passafiume O, Mousseau L. Detecting hydrologic seasons in a long term monitoring time series. In *Time-series analysis in marine science and applications for industry*. Brest, France
- 2009 **Irisson J-O**, Paris CB, Cowen RK, Planes S. Ontogenetic vertical “migration” in coral-reef fish larvae communities and its consequences for dispersal. In *Aquatic Sciences Meeting*. Nice, France
- 2008 **Irisson J-O**, Chérubin LM, Planes S. Consequences of increased mobility and quicker development in warmer waters on the dispersal trajectories of fish larvae. In *Ocean Sciences Meeting*. Orlando, FL, USA. Best student presentation award.
- Irisson J-O**, Paris CB, De Lara M, Planes S (2008b) The importance of behavior for self-recruitment: a modelling approach. In *International Coral Reef Symposium*. Fort Lauderdale, FL, USA
- 2006 **Irisson J-O**, Paris CB, Guigand CM, Fisher R. Orientation With No Frame of Reference (OWNFOR): An in situ system to detect and measure orientation in pelagic reef fish larvae. *Ocean Sciences Meeting*. Honolulu, HI, USA
- 2005 **Irisson J-O**, De Lara M, Planes S. Lagrangian or not lagrangian? In *LAPCOD meeting*. Lerici, Italy

3 Supervision and evaluation

3.1 Research supervision

- Current** Louise Laux, PhD (supervisor), Sorbonne Université: *Scales of variability in planktonic communities: effects of environmental forcing and of the internal dynamics of the system*.
- Enza Labourdette, PhD (supervisor), Sorbonne Université: *Deep learning to predict plankton communities from space*.
- Camille Sant, PhD (co-supervisor), Sorbonne Université: *Multiscale analysis of past and future connectivity in marine populations*.
- Miriam Beck, post-doctoral researcher, AtlantECO project: *How the morphology of marine snow particles influences the global carbon flux*.
- 2023 Thelma Panaïotis, PhD (supervisor), Sorbonne Université: *Plankton distribution across scales: contributions from artificial intelligence to plankton ecology*.

- Cédric Dubois, PhD (co-supervisor), CNRS-Université Côte d'Azur: *A Nearest-Neighbours Kernel for Classification: a Case Study of In Situ Two-Dimensional Plankton Images with Correction of Total Volume Estimates for Copepods.*
- Florian Ricour, PhD (co-supervisor), Université de Liège-Sorbonne Université: *Towards a new insight of the carbon transport in the global ocean.*
- Louise Laux, post-Master internship, 6 months: *Biological observations of plankton during the MOOSE-GE monitoring cruises in the North Western Mediterranean Sea.*
- 2022 Yongtao Wei, stage de fin d'études Polytech, Sorbonne Université: *Étude d'une architecture de traitement et de classification d'images de plancton embarquée sur un capteur intelligent autonome.*
- Miriam Beck, post-doctoral researcher, FORMAL project: *Morphological diversity increases with decreasing resources along a zooplankton time series.*
- Alexandre Schickele, post-doctoral researcher, Blue-Cloud project: *Global scale distribution of carbon concentration mechanisms in pico-eukaryotes inferred through machine learning from metagenomic signals.*
- 2021 Ewen Ancel, Intechmer: *Comparaison de protocoles d'échantillonnage de plancton à deux sites Méditerranéens.*
- Salomé Fabri-Ruiz, post-doctoral researcher, CoClime project: *Harmful algal blooms could extend in time span with climate change in the Western Mediterranean Sea.*
- 2020 Laetitia Drago, Master 2 Sciences de la Mer, Sorbonne Université: *Distribution mondiale de la biomasse du macroplancton estimée par imagerie in situ.* Continued as a PhD student at LOV, France.
- 2019 Thelma Panaiotis, Master 2 Sciences de la Mer, Sorbonne Université: *Typologie globale de la distribution tridimensionnelle des communautés de plancton vues par imagerie in situ.* Continued as a PhD student at LOV, France.
- Laure Vilgrain, Master 2 Sciences de la Mer, Sorbonne Université: *Identification de traits morphologiques du zooplancton arctique à partir d'imagerie in situ et description de leurs distributions selon les gradients environnementaux en Baie de Baffin.* Continued as a PhD student at LOV, France.
- 2018 Lauriane Bergeon, L3, Univ Montpellier: *Suivi historique des population de plancton en rade de Villefranche sur mer.*
- Caroline Cailleton, Master 2 Sciences de la mer et du littoral, Univ Bretagne Occidentale: *Étude de la diversité morphologique du zooplancton marin le long d'une série temporelle (2009-2017) en Méditerranée.* Is now employed in a biological conservation organisation.
- 2017 Raphaël Voué, DU, Univ Montpellier: *Dynamique spatio-temporelle du recrutement des poissons côtiers en Méditerranée Française.* Internship resulted in a paper currently in the second round of review.
- Justine Courboulès, Master 2 Océanographie et Environnement Marin, Univ Pierre et Marie Curie: *Étude comparative des changements à long terme des écosystèmes côtiers et hauturiers en Méditerranée Nord-Occidentale.* Continued as a PhD student at MARBEC, Sète.
- 2016 Joshua Bac, Intechmer: *Observation de l'hydrologie, du zooplancton et des larves de poissons en rade de Villefranche.*
- 2015 Robin Faillettaz, PhD (supervisor), Univ Pierre et Marie Curie: *Estimation des capacités comportementales des larves de poissons et leurs implications pour la phase larvaire, Un cas d'étude d'espèces démersales de Méditerranée Nord-Occidentale.* Published 5 pa-

pers directly related to the PhD work. Continued as a post-doc at LOG, France, and now at Univ Miami, USA.

Mégane Tetaz, Master 1 Biologie et Santé de l'Environnement, Univ Nice: *Influence de la qualité du développement larvaire de poissons méditerranéens sur leur vitesse de nage.*

Julie Lafaye, ESPCI 1ère année: *Suivi du recrutement des larves de poissons côtiers en Méditerranée.*

2014 Federica Ferrando, Master, Univ di Messina: *Utilizzo di due differenti metodologie di analisi per lo studio della comunità zooplanctonica in aree idrologicamente diverse del Mediterraneo.* Internship resulted in a published paper.

Elysanne Durand, Master 1 Océanographie et Environnement Marin, Univ Pierre et Marie Curie: *Vitesse de nage des larves de poissons démersaux méditerranéens et conséquences pour la dispersion.* Internship resulted in a published paper.

Agathe Maupetit, VetAgro'Sup: *Étude de la distribution des organismes planctoniques dans le courant Ligure.* Internship resulted in a published paper.

Agathe Blandin, Master 1 Océanographie et Environnement Marin, Univ Pierre et Marie Curie: *Comportement d'orientation de larves de poissons côtiers en phase de recrutement en mer Méditerranée.* Internship resulted in a published paper.

2013 Mariam Sy, Master 2, Agriculture, Alimentation et Développement Durable, Univ Montpellier: *Indice de services écosystémiques en Méditerranée.* Continued as a PhD student at Univ Montpellier.

2012 Alice Webb, Master 2 Oceanography, IMBRSea: *Hydrological seasonal and inter-annual variability in the Bay of Villefranche sur Mer during 1995-2011 and biochemical consequences.*

Alexis Deru-Denise, INP ENSE3, Grenoble: *Reconnaissance du zooplancton assistée par ordinateur.*

2011 Leïla Ezzat, Master, Ecole Polytechnique Fédérale de Lausanne: *Distribution verticale de larves de poissons coralliens à la Barbade.* Continued as a PhD student in Monaco.

2010 Elise Lacoste, Master 2 Océanographie et Environnement Marin, Univ Pierre et Marie Curie: *Couplage entre la distribution des larves de poissons coralliens et de leurs proies potentielles.* Continued as a PhD student in EPHE/Univ Perpignan.

2009 Erwan Delrieu-Trotin, Master 2 Océanographie et Environnement Marin, Univ Pierre et Marie Curie: *Distribution des larves de poissons coralliens: stratégies écologiques et corrélats environnementaux.* Continued as a PhD student in EPHE/Univ Perpignan.

2007 Pierre Torres, Master 1 Écologie Fonctionnelle, Univ Perpignan: *Importance écologique de la distribution verticale des larves de poissons coralliens.*

2006 Aubin Mboumba, Master 1 Environnement Méditerranéen, Univ Perpignan: *Distribution verticale des larves de poissons coralliens autour de la Barbade.*

3.2 Research evaluation

Beyond supervising students in my own, I contribute to the supervision or evaluation of students in other labs.

Current Alexa Abagnan, PhD (committee member), IFREMER: *Exploration de l'éthologie à fine échelle comme levier d'amélioration des engins de pêche.*

- Aishwarya Venkataramanan, PhD (committee member), Univ Metz: *Automatic Detection of Diatoms using Deep Learning for Ecological Diagnosis of Freshwaters.*
- Elena Berhocoïrigoin, PhD (committee member), Georgia Tech: *Spatio-temporal Interpolation and Hybrid AI for Application to Biodiversity.*
- Margaux Perhirin, PhD (committee member), Sorbonne Université: *Impact de la diversité fonctionnelle du mésozooplancton marin sur les flux de carbone : de l'analyse de données à haut débit (imagerie, -omique) à la modélisation.*
- Marion Vilain, PhD (committee member), MNHN: *Dynamique spatio-temporelle et habitats des communautés zooplanctoniques : caractérisation de l'état écologique des écosystèmes pélagiques français.*
- Raed Halawi-Ghosn, PhD (committee member), Univ Littoral Côte d'Opale: *Machine Learning and Harmful Phytoplankton: Definition of Environmental Statuses Favourable for Blooms, Bloom Dynamic, and Development of an Expert Forecasting, Warning and Decision-Making System.*
- 2023 Megan Clampitt, PhD (committee and jury member), Univ Côte d'Azur, Nice: *Indexing coral health status by an artificial intelligence approach.*
- 2022 Jeremy Wicquart, PhD (committee member), EPHE: *Tendances temporelles, perturbations et résilience des récifs coralliens.*
- 2021 Charlène Guillaumot, PhD (thesis reviewer and jury member), Univ Bourgogne Franche-Comté: *Modelling the response of Antarctic marine species to environmental changes. Methods, applications and limitations.*
- 2018 Matt Forettich, PhD (committee and jury member), Univ Miami: *The chemosensory context of larval fish navigation.*
- Amelie Rossi, PhD (committee and jury member), Univ Pasquale Paoli: *Approche morphologique et comportementale de jeunes stades de poissons côtiers méditerranéens sur le littoral Nord-Est de la Corse (Méditerranée Nord-Occidentale).*
- 2017 Marc Besson, PhD (committee member), EPHE: *The importance of metamorphosis in the larval recruitment of coral reef fishes facing climate change and pollutions.*
- Naama Kimmerling, PhD (reviewer), Ben-Gurion University of the Negev: *Species-Level Spatial and Temporal Dynamics of Coral Reef Fish Larvae in the Gulf of Aqaba.*
- 2016 Sara Labrousse, PhD (committee and jury member), Univ Pierre et Marie Curie: *Beneath the sea ice : exploring elephant seal foraging strategy in Earth's extreme Antarctic polar environment.*
- 2015 Jessica Y Luo, PhD (committee and jury member), Univ Miami: *Gelatinous zooplankton in marine communities and ecosystems: fine-scale horizontal and vertical distribution, trophic drivers, and contribution to global carbon cycling.*
- Pablo Brosset, PhD (committee member), Univ Montpellier: *Condition corporelle et conséquences sur la plasticité des traits d'histoire de vie chez les petits pélagiques de Méditerranée.*
- Alessandro Cau, PhD (reviewer), Università degli Studi di Cagliari: *Deep coral forests from the island of Sardinia.*
- 2014 Marion Cuif, PhD (committee member), IRD: *Connectivité des populations marines.*
- I also act as a reviewer of scientific papers and projects:
- Ongoing Reviewer for Aquatic Biology, Canadian Journal of Fisheries and Aquatic Sciences, Coral Reefs, Ecology Letters, Ecological Complexity, Estuarine Coastal and Shelf Science, Frontiers in Marine Science, Global Change Biology, ICES Journal

of Marine Science, Ichthyological Research, Integrative and Comparative Biology, Interface Focus, Journal of Plankton Research, Journal of Statistical Software, Limnology and Oceanography: Methods, Marine Biology, Nature Communications, PCI Ecology, PeerJ, PLoS ONE, The R Journal.

Reviewer or panel member for Agence Nationale de la Recherche (ANR), Belspo (Belgium), CNRS (INSU, LEFE and GMMC), Commission Nationale de la Flotte Côtière, Fondation pour la Recherche sur la Biodiversité (FRB), Haut Conseil de l'Évaluation de la Recherche et de l'Enseignement Supérieur (HCÉRES), Institut Français de Recherche pour l'Exploitation de la MER (IFREMER), National Geographic, Research Foundation - Flanders (FWO), Sorbonne Université.

4 Teaching

I taught 64h per year as teaching assistant during my PhD and teach over 200h per year as associate professor since 2009, mostly at Masters level. I am in charge of three teaching modules.

2009- Instrumentation and Acquisition of Data in Oceanography (**coordinator**), Master 2 Sciences de la Mer, Sorbonne Univ: *Scientific cruise planning* (4.5h), *Databases for oceanography* (6h), *Plankton imaging* (3h), *Data processing* (3h) *Supervision of student projects* (6h), and participation to an oceanographic cruise (2 days).

Methods for Data Exploitation in Oceanography (**coordinator**), Master 2 Sciences de la Mer, Sorbonne Univ: *R for data science* (9h), *Mapping and interpolation with practical* (3+6h), *Introduction to multivariate data analysis with practical* (3+1.5h), *Signal processing with practical* (3+3h), *Supervision of student projects* (6h), *Data processing* (4.5h) [and previously: *Oceanographic "big" data processing with practical* (3+3h)]

Modelling, Master 2 Sciences de la Mer, Sorbonne Univ: class + practical for all topics, *Lagrangian models* (2+3h), *Advanced population dynamics* (2+3h), *Supervision of student projects* (3h) [and previously: *Optimal behaviour* (3+3h)]

Multivariate Statistics (**coordinator**), Summer school, Sorbonne Univ: class + practical for all topics, *Introduction to programming with R* (6h), *Data series* (6+6h), *Redundancy analysis* (3+3h), *Tree-based learning* (3+3h) [and previously: *Multivariate regression* (3+3h)]

Plankton diversity, Summer school, Sorbonne Univ: *Ichthyoplankton ecology and taxonomy*, with practical (3h)

2010-2020 Agrégation SVTU, Sorbonne Univ: *Behavioural Ecology* (8h), *Sexual selection* (4h)

2018-2020 Exploited marine resources (co-coordinator), Master 2 Sciences de la Mer, Sorbonne Univ: *Ichthyoplankton ecology*, with modelling practical (3+3h)

2017-2019 Introduction to modelling, Master 1 Sciences de la Mer, Sorbonne Univ: *Introduction to population dynamics* (4h)

2009-2018 Response of plankton to environmental changes, Master 2, Sciences de la Mer, Sorbonne Univ: *Ichthyoplankton's response to its environment* (3h)

2016-2017 Biological processes in the ocean, Master 1 Sciences de la Mer, Sorbonne Univ: *Connectivity of marine populations*, with modelling practical (6h)

2014-2016 Research education, License Biologie, Sorbonne Univ: *Scientific communication* (7h), *Connectivity and marine reserves* (7h)

- 2012-2016 Coordinator of a student and professor exchange program between the oceanography departments of Univ Pierre et Marie Curie and of the Rosenstiel School of Marine and Atmospheric Sciences or Univ Miami. The program directly involved 12 professors and 26 students.
- 2015 Graduate courses, RSMAS, Univ Miami: Multivariate Statistics, similar to the one taught at Sorbonne Univ (above) but adapted to the graduate program at RSMAS.
- 2013 Graduate courses, RSMAS, Univ Miami: *Ichthyoplankton response to physical forcings* (3h)
- 2009-2015 GIS and spatial processes, Master 2, Sciences de la Mer, Sorbonne Univ: *Introduction to R* (3h), *Species distribution modelling* (3h)
- 2009-2010 Introduction to modelling for conservation, Master 2, Sciences de la Mer, Sorbonne Univ: *Modelling population dynamics* (8h)
- 2005-2008 Agrégation SVTU, Univ Montpellier: *The ecology of sociality* (8h)
- 2004-2008 Biology, License pluridisciplinaire 3, Univ Perpignan: 60h of classes on general biology (from cell processes to environmental sciences); I was coordinator of the biology curriculum, taught most classes and graded all exams
- 2006-2007 Reef Ecology, EPHE/Univ Perp: *Hydrodynamics, modelling and larval flux* (3h)
- 2002-2006 Master 1 Ecology, École Normale Supérieure/Univ Pierre Marie Curie: *Bifurcation analysis* (6h), *Interspecific relationships* (3h)

5 Community activities

- 2019- Leader of team COMPUtational PLankton Ecology (COMPLEx; 13 permanent staff, 15 contract staff, 15 students and post docs), Laboratoire d'Océanographie de Villefranche (LOV).
Coordinator of the plankton observation time series of Villefranche-sur-Mer (1 full-time person, weekly samples, all year).
- 2019-2022 Chair of the International Council for the Exploration of the Sea (ICES) working group on Machine Learning for Marine Sciences (WGMLEARN).
- 2019-2021 Member of the European Marine Board panel on Big Data.
- 2016-2018 Leader of team Processus dans les Ecosystèmes Pélagiques (PEPS; 19 permanent staff, 15 contract staff), Laboratoire d'Océanographie de Villefranche (LOV).
- 2015-2018 Panel member of the Commission Nationale de la Flotte Côtière (CNFC) which attributes ship time on the vessels of the French Oceanographic Fleet.
- 2013-2020 Member of the board of the Société Française d'Écologie et d'Évolution (French Society for Ecology and Evolution). I contributed to the general policy decisions of the society, its opinion statements, and its awards; I was more particularly in charge of the website and the jobs/internships publication mailing list (9000 subscribers).
- 2013-2017 Coordinator of the ecosystem observation actions at Observatoire Océanologique de Villefranche (19 full-time equivalent staff, ~1M€ total yearly budget). I coordinated the global time allocation of engineers and the local 25k€ supplementary budget; I also consolidated all data collected and created interactive applications to explore it at <http://www.obs-vlfr.fr/data/view/>.