

David NERINI

Section 21 - Système Terre : enveloppes continentales

Collège B2

Position : **Associate professor in Marine Sciences**

MIO, Mediterranean Institute of Oceanography, UM 110, CNRS, IRD, Aix-Marseille University (AMU), Marseille, France.

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Qualifications

2000 PhD in Environmental Sciences, Université Aix-Marseille II, Marseille, France.

2019 Habilitation à diriger des Recherches (Habilitation to supervise research) in Environmental Sciences, AMU, Marseille, France

Professional experience

1997 - 2002 Teaching assistant in statistics and computer sciences at Université Aix-Marseille II.

Dec. 2001 - Aug. 2002 PostDoc position at Laboratoire de Statistiques et Probabilités, Pr. Ph. Besse, Université de Toulouse-Rangueil, Toulouse, France.

Since Sept. 2002 Associate Professor, Aix-Marseille University.

– 1st class Associate Professor in 2020.

– Responsible for the team ECOMAD "Theoretical Ecology, Modelisation & Data Analysis" since 2022 (11 permanent people, 13 Phds and PostDocs).

– (Co-)responsible for the Professional Master in Oceanography, OSU Pytheas, AMU , 09/2008 → 09/2019.

– CNU member, section 67, 2012 → 2015.

– IRS CSS3 member 2017 → 2020.

– HCERES Appointed member (MARBEC Laboratory, Montpellier, 2020, LOCEAN Laboratory, Paris 2018, ECCE-TERRA Scientific Observatory, Paris, 2018)

– INRAE CRCN34 commission, 2024.

Research interests

Theoretical ecology, Oceanography, Functional data analysis, Machine Learning

Selected facts

- 62 articles published in peer-reviewed international journals

– in environmental sciences and related topics :

Acta biotheoretica (3), *Aquatic Living Ressources*, *CRAS-B* (2), *Cytometry A*, *Deep Sea Research II*, *Earth and Planetary Science Letters*, *Earth System Science Data*, *Ecological Complexity* (3), *Ecological Modelling*, *Ecology and Evolution*, *Faraday Discussions*, *Fisheries Oceanography*, *Frontiers in Marine Science* (2), *Frontiers in Microbiology*, *Geophysical Research Letters* (2), *Journal of Biogeography*, *Journal of Environmental Management*, *Journal of Experimental Marine Biology and Ecology*, *Journal of Geophysical Research*, *Journal of Mammalian Evolution*, *Journal of Marine Systems* (3), *Journal of Physical Oceanography* (4), *JRS Interface*, *JRS Open Science*, *JRS Philosophical Transactions A*, *Limnology and Oceanography Methods*, *Luminescence*, *Marine Chemistry*, *Marine Pollution Bulletin*, *Microbial Ecology*, *Nature Communications*, *Organic Geochemistry*, *Plos ONE*, *Progress in Oceanography* (6), *Science Advances*,

– in statistics and applied maths :

Computational Statistics and Data Analysis, *Journal of Applied Statistics*, *Journal of Multivariate Analysis*, *Journal of Theoretical Biology* (3), *SIAM Journal on Applied Mathematics*, *Springer Series in Statistics*, *Wiley Series in Probability and Statistics*.

- Invited editor for *Acta Biotheoretica* (2010), *Ecological Complexity* (2016, 2017), *Philosophical Transactions of the Royal Statistical Society A* (2009)
- Invitations in universities abroad : Univ. Stockholm, Sweden (2016, 2018, 1 month), Columbus State University, USA (NSF funds, 2014, 2 weeks).
- (Co)-Supervision of 39 postgraduate internships (M2), 13 PhD theses defended or in progress (3).
- Committee member for the defense of 15 PhD theses and 1 HdR as referee.
- Responsible for research contracts with institutional companies or foundations : OFB, GIPREB, GIS Positionie .
- ANR and national programs :
POCOROCh-Med (OFB, 2022-2025), ANR SOTroC (2024-2027), RAP-MED project, Amidex, AMU (2020-2023), ANR MOBYDICK (2016-2020), ANR ADACNI (2012-2016), ANR POTES (2004-2009), Program ZOOPE-NEC (2004-2006), Program UVECO (2004-2005), Program SEMPO, INRIA Sophia-Antipolis (2002-2003). National Program for Coastal Ecology - ART 4 (2000-2002)
- Board member of learned societies (*French Speaking Society for Theoretical Biology since 2002, French Speaking Society of Statistics since, Environment bureau, 2020-2025*)
- Co-responsible for the organization of 11 national and international conferences (including SFDS conf. (2010, 2025) in Marseille (400 participants) and MPDE 2016 in CIRM Marseille (100 participants)).

Selection of 5 significant publications

1. NERINI, D., MONESTIEZ, P. AND C., MANTÉ (2010). Cokriging for functional data. *Journal of Multivariate Analysis*, **109 (2)**, 409-418.
Generalization of kriging when data are spatially sampled curves. A spatial functional linear model is constructed including spatial dependencies between curves. The methodological developments are illustrated with temperature profiles sampled with dives of elephant seals in the Antarctic Ocean.
2. FONVIEILLE, N., GUINET, C. AND D., NERINI (2023). Swimming in an ocean of curves : A functional approach to understanding elephant seal habitat use in the Argentine Basin. *Progress in Oceanography*, **218 (3)**, 103-120.
On the use of functional PCA in a multivariate context where a wide collection of temperature and salinity profiles are sampled with elephant seals in the Southern Atlantic Ocean. Comparison with climatic model outputs and relations with foraging behaviour of elephant seals.
3. S., LABROUSSE, NERINI, D., FRASER A., D., SALAS, L., SUMNER, M., LE MANACH, F., JENOUVRIER, S., ILES, D. AND M., LARUE (2023). Where to live? Landfast sea ice shapes emperor penguin habitat around Antarctica. *Science Advances* **9 (39)**, 1-13.
A study of habitat distribution of the emperor penguin around Antarctica continent. PCA-like dimension reduction techniques are used to understand the suitable habitat conditions and probabilities of possible installation are computed all around the continent using a Bayesian statistical approach from a huge set of composite environmental variables.
4. IZARD, L., FONVIEILLE, N., MERLAND, C., KOUUBI, P., NERINI, D. ET. AL. (2023). Decomposing acoustic signal reveals the pelagic response to a frontal system between oceanic domains *Journal of Marine Systems*, **243 (5)**, 1-19.
The study of frontal areas nearby the polar front in the Antarctic Ocean with the use of acoustic profiles from an oceanographic campaign. A multivariate version of functional PCA with group of profiles that range at different depth allows to characterize different habitats of small pelagic organisms and role of frontal areas in their distribution.
5. PAUTHENET, E., ROQUET, F., MADEC, G., SALLÉ, J.-B. AND D., NERINI (2019). The thermo-haline mode of the global ocean. *Journal of Physical Oceanography*, **49**, 2535-2552.
The study of shape of temperature-salinity profiles from climatic model outputs for the world ocean using multivariate functional PCA and related classification methods.