Amélie Lehuen - Estuarine ecosystems Ph.D.

44 yo alehuen@gmail.com

Professional experience: 5 years

2024-25 (15 months) – Post-Doc – fixed-term contract – Laboratory MERSEA UR7482 - Marine ecosystems and organisms research lab – CREC Coastal Environment Research Centre of Luc/Mer – Caen University.

Evaluation of the ecological functioning of lateral mudflats upstream of Tancarville to guide new ecological restoration projects through a comparative approach to the functional biodiversity of benthic communities (EVEREST).

- Spatio-temporal assessment of 5 mudflats in the Seine estuary using multivariate analysis of the macrozoobenthic fauna, microphytobenthos and sediment compartments (biodiversity indicators, Chl *a*, EPS, POM, DOM, fluorimetry, primary production, CO_2 and O_2 fluxes, granulometry). Proposal for a mudflat ecological status indicator.
- Funding: GIP Seine Aval- Partners: EPOC UMR 5805 CNRS - Bordeaux Université, METIS UMR 7619 CNRS-Sorbonne Université-EPHE, AD2M UMR 7144, Sorbonne Université/CNRS, CSLN Cellule de Suivi du Littoral Normand.

2020-24 (3 years 3 months) – PhD Researcher – Researcher Engineer – fixed-term contract - Laboratory of biology of organisms and aquatic ecosystems BOREA UMR8067, Caen – CREC Coastal Environment Research Centre of Luc/Mer – Caen University.

Marine ecosystem engineers' long-term evolution modelling in response to climate change and sediment transport in Seine estuary (MELTING POTES).

- Study of the feedback loop between the sedimentary environment and the benthic macrofauna within an estuary: 1) model of an optimal ecological niche by constructing a distribution model of the *Cerastoderma edule* cockle by three hydro-morpho-sedimentary variables of the estuary (MARS3D, netcdf, quantile regression, GIS); 2) model of the creation of a biogenic layer of sediment subjected to daily erosion by the activity of *C. edule* (Matlab); 3) experimental comparison of the combined effects of two species on sediment erodibility, according to three pairs of species at various relative densities and three temperatures, and attempted modelling via total metabolic rate (Brey, respirometry, erodimetry, ANCOVA).
- Funding: OFB-MIE, Région Normandie - Partners: IFREMER Brest, NIOZ Pays Bas, Italian National Research Council, Italie, Cellule de Suivi du Littoral Normand, Maison de l'estuaire.

2020-22 (46h) - Vacation teaching – Caen University of Technology campus 2

2021-22 - L3: Tutored project

2020-21 - L2: Applied computer data analysis, Environmental analysis; L3: Marine ecosystem management & marine biology, Tutored project

2020 (9 months) – Research engineer – internship and fixed-term contract - Laboratory of biology of organisms and aquatic ecosystems BOREA UMR8067 – CREC Coastal Environment Research Centre of Luc/Mer – Caen University.

Prediction of the distribution of macrozoobenthic species in the Seine estuary in response to hydro-morpho-sedimentary changes: first applications on the population of cockles, Cerastoderma edule. Definition of optimal ecological niches by quantile regression.

2019 (6 months) – Benthic technician – internship – GEMEL-Normandie – Luc-sur-Mer

Evaluation of a stock of bivalves and associated fauna following a scientific reserve creation on the west coast of Cotentin.

0000-0002-3150-6878 - am-lh - Amelie-Lehuen

Amélie Lehuen - Estuarine ecosystems Ph.D.

44 yo alehuen@gmail.com

Previous experience: 14 years

2018 (8 months) – QHSE engineer– permanent contract – GB Ouest– Projet Revima-APU – Rives-en-Seine

Creation of chemicals database, collective and individual protections rationalization, study of REACH exposure scenarios.

2011-17 (6 years) – Utilities Project Manager – permanent contract – GB Ouest– Projet Chevron Oronite – Le Havre

Quantitative and qualitative improvement of the condensate network, sharing of KPIs and Best Practices.
Replacement of a steam boiler (€4.3m), improving the reliability of steam distribution, optimising the demineralisation unit.
Consolidation of the cooling water network (performance and energy savings).
Bringing the thermal fluid network up to standard and eliminating risks. Study and thermal assessment of the network.
Overall plan €1.5m/year, ~15 projects, development and sharing of project management tools.
Coordination with the General Services shutdown unit for work on the networks (every 18 months).

2010-11 (6 months) – Process Improvement engineer– fixed-term contract – Lubrizol– Rouen

Health, Safety and Environment project management, global budget 1M€.

2010 (8 months) – Environment engineer– fixed-term contract – Petroplus– Petit Couronne Refinery

Pilot odour treatment of the WWTP decanter: installation, sampling and analysis in coordination with the supplier.
Monitoring and improvement of flow and performance of the refinery Waste Water Treatment Plant. Communication of indicators.

2007–09 (1,5 years) – Process Control engineer – fixed-term contract – Lubrizol– Rouen

Development of an online statistical analysis and quality control module, interface between US (Emerson Process Management) developers/statisticians and production to obtain a process-oriented tool.
Development of statistical process control tools for process drift detection, alarm dashboard, Six Sigma development context. Statgraphics ambassador and user support for the production team.

2007 (5 months) – R&D Process engineer – fixed-term contract – Cristal-Millennium Inorganic Chemicals– Le Havre

Stabilization and optimization of white gypsum unit, industrial testing, mineral analysis (granulometry), US and production reporting.

2004-05 (2 years) – Process Improvement engineer – internship and fixed-term contract – Lubrizol– Rouen

Modelling of mixing tank washings with experimental design and process optimisation to reduce the quantity of oil, inter-batch times and contamination between batches.
Continuous improvement projects: new stirring systems, installation of a drum emptying system, etc. Production support and project management. Analysis of non-conformities.

Education

Juin 2025 (5 days) - Sediment-Water Interactions Summer School – Wimereux –Lille University

Passive thin-layer samplers for understanding diagenetic processes at the water-sediment interface. Production and fluorescence of microphytobenthos on bare mudflats. Water-sediment and air-sediment CO2 and O2 fluxes. Influence of bioturbation on microplastic burial. Sediment transport and preservation of estuarine zones.

2020-23 – Doctoral thesis in Physiology and biology of organisms - populations - interactions

Caen University – ED497 nBISE – Laboratory of biology of organisms and aquatic ecosystems BOREA UMR8067 - Director : Dr. Francis Orvain

0000-0002-3150-6878 - am-lh - Amelie-Lehuen

Amélie Lehuen - Estuarine ecosystems Ph.D.

44 yo alehuen@gmail.com

Marine ecosystem engineers' long-term evolution modelling in response to climate change and sediment transport in Seine estuary.

2019-20 - MSc 2 Ocean Sciences, Coastal Living Resources Exploitation – Caen University.

Coastal ecosystems and food webs, Coastal areas: Knowledge and sustainable management
Physiology of marine organisms, Exploitation of fish, shellfish, and algal species.

2018-19 - BSc Professions of environmental protection & management Ecological restoration & sustainable development – Caen University of Technology.

Natural habitats rehabilitation: Marine ecosystems management, Impact study, Ecological restoration, GIS; Habitats analysis; Sustainable Development and Environmental Management.
Tutored project: Primary production analysis of microphytobenthos on the Orne estuary foreshore and spectral data acquired by GIS.

2004 - Engineer degree – Rouen National Institute of Applied Sciences (INSA)

Fine Chemistry and Engineering Department – specialism in Materials and Polymers

Responsibilities

2023 (ongoing) Member of CYBER-COAST group – Future Earth Coasts (FEC)

International working group on the resilience of ecosystems in the face of global change, from the perspective of cybernetics and eco-energetics.

2024-25 Member of Scientific Council of Seine Estuary (CSES) – DREAL Normandie

The Council issues opinions on development programmes, works or management measures likely to have an impact on the functioning of estuarine ecosystems.

2021 – 25 (4 ans) Association Treasurer –GEMEL Normandie Association

Finances: Cash flow monitoring, budget forecasts, annual balance sheet. Implementation of cost accounting. Discussions with chartered accountant and statutory auditor.

Social management: 3 permanent employees (contract reviews, individual interviews), recruitment of temporary contracts.

Association: Set up of a Local Aid Scheme (DLA), development of organizational tools and practices to monitor projects, workload, costs, and volunteer activities.

Skills

0000-0002-3150-6878 - am-lh - Amelie-Lehuen

Amélie Lehuen - Estuarine ecosystems Ph.D.

44 yo alehuen@gmail.com

Communications

Publications

Lehuen, A., et al. (2025) 'A novel quantile regression approach to define optimal ecological niche: a case study on habitat suitability of cockle populations (Cerastoderma edule)', Peer Community In Ecology [Preprint]. https://normandie-univ.hal.science/hal-04438267.

Lehuen, A. and Orvain, F. (2024) 'A cockle-induced bioturbation model and its impact on sediment erodibility: A meta-analysis', Science of The Total Environment, 912, p. 168936. https://doi.org/10.1016/j.scitotenv.2023.168936.

Lehuen, A. et al. (2024) 'Multispecies macrozoobenthic seasonal bioturbation effect on sediment erodibility', Journal of Sea Research, 201, p. 102525. https://doi.org/10.1016/j.seares.2024.102525.

Posters

Août 2022 - Nereis park– Logonna-Daoulas, France

Lehuen, A., Dancie, C., Grasso, F., et al., 2022. A modelling approach for predicting species distribution in Seine estuary by applying an Optimal Ecological Niche model: First application to *Cerastoderma edule* population.

Lehuen, A. et Orvain, F., 2022. Bioturbation model of *Cerastoderma edule* based on metabolic activity and sediment composition: a meta-analysis.

Lehuen, A. et Orvain, F., 2022. MELTING POTES Marine ecosystem engineers' long-term evolution: a modelling study of benthic faunal activity and distribution in response to climate change and sediment transport in Seine estuary.

Septembre 2022 - ECSA59 – San Sebastian, Espagne

Lehuen, A., Dancie, C., Grasso, F., et al., 2022. A modelling approach for predicting species distribution in Seine estuary by applying an Optimal Ecological Niche model: First application to *Cerastoderma edule* population.

Expertise

Mai 2023 (4 days) – Mai 2025 (5 days) – Co-organization Workshops NEO & NEO2– ILICO - CREC

Study of "Optimal Ecological Niche" species distribution models and inter-SNO (Systèmes National d'Observation) taxonomic and functional distribution: Coupling of hydro-biological data (low-frequency SOMLIT and high-frequency COASTHF) with planktonic (PHYTOBS) and benthic (BENTHOS) species distribution data in coastal ecosystems of mainland France. Workshop for 15 people.

Interests

Permaculture

2019: Permaculture Design Course – CDFP l'Escargotier, Le Havre.

Musique

2017 & 19: Jazz singing masterclass – Jazzitudes, Lisieux.

10 years of musical practice in band as singer and guitarist.

2012-17: Monthly open mike (Lavomatic Tour).

Danse

2004-12: Mandingue and Sabar weekly practice – Kai Danse, Rouen.

2012-14: Contemporary dance shows Rainbow et Cosmo Bal – Le Phare, Le Havre.

Keywords

Bioturbation
Macrozoobenthos
Estuary, Coastal
Intertidal, Mudflat
Species Distribution Model (SDM)
Optimal Ecological Niches
Quantile regression
Suitability index
Erosion model
Hydro-morpho-sedimentary model
Metabolic rate
Data analysis
Geo-statistics

0000-0002-3150-6878 - am-lh - Amelie-Lehuen