

Nicolas LACHAUX • Postdoctoral Researcher



05/05/1991 in Beaune (France)



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Overview of my research profile: Through my research activities in **aquatic ecotoxicology**, I deal with environmental and societal issues such as chemical pollution, loss of biodiversity and degradation of water resources (UN Sustainable Development Goals). I am interested in **emerging contaminants**, especially in technological critical elements (e.g. rare earth elements, lithium). I investigate them both in the **field** and in the **lab** (microcosms, mesocosms) through a holistic approach from their **occurrence** and **fate** in the medium (analysis of their distribution in abiotic compartments, speciation modelling) until their **environmental risk assessment** (risk ratios calculation, species sensitivity distribution) *via* their **bioaccumulation** (organotropism, subcellular compartmentation, toxicokinetic analyses) and their **biological effects** (ecotoxicological assays, biomarkers measurement) on **animal** (bivalves, crustacean, fish) and **vegetal** (unicellular algae, macrophyte) species at **different levels of biological organization** (from subcellular to food web levels). Being biologist and ecologist from my education, I develop collaboration with colleagues from other specialties (geochemistry, modelling) to conduct a **multidisciplinary research**. I am looking for a new postdoctoral experience in order to acquire complementary skills by using other methodological approaches, techniques, contaminant, biological model, etc.

SKILLS



SCIENTIFIC

Issues identification • Design of methodological approach • Field sampling • Performing of experiment • Data analysis (statistics) and interpretation • Literature search • Results dissemination

WRITTEN AND ORAL COMMUNICATION

Peer-review publications • Presentation in conferences (poster, oral) • Report writing • Team working • Science outreach

COMPUTER

C2I : Diploma of Internet and computer skills • Word • Excel • PowerPoint • RStudio • Visual Minteq • Regtox • ImajeJ • PAST • GraphPad Prism

LANGUAGES

French : native language
English : B2
Spanish : C1

EDUCATION



2018-2022 • PHD IN ECOTOXICOLOGY, BIODIVERSITY, ECOSYSTEMS •

University of Lorraine – Metz (France)

2016-2018 • MASTER IN ECOTOXICOLOGY AND ECOLOGY OF ANTHROPIC SYSTEMS •

University of Lorraine – Metz (France)

2013-2016 • BACHELOR IN ECOLOGY AND BIOLOGY OF ORGANISMS •

University of Montpellier (France)

2012-2013 • PREPARATION TO SCIENTIFIC STUDIES

• University Blaise Pascal - Clermont-Ferrand (France)

2012 • BACHELOR IN BUSINESS TECHNIQUES

(ERASMUS) • Economy University of Bratislava (Slovakia) • Courses in English

2011 • ERASMUS IN SPAIN •

Business University of Zaragoza (Spain) • Courses in Spanish

2009-2011 • UNIVERSITY DIPLOMA OF TECHNOLOGY IN BUSINESS TECHNIQUES •

University of Burgundy – IUT Auxerre (France)

2009 • BACCALAUREATE IN ECONOMY AND

SOCIAL • High school Saint-Cœur – Beaune (France)



2023-2024 (20 months) • **POSTDOC POSITION IN ECOTOXICOLOGY • Assessment of the occurrence and biological effects lithium (Li) and its isotopes in aquatic ecosystems •**
LIEC: Laboratoire Interdisciplinaire des Environnements Continentaux – Metz (France) in collaboration with CRPG: Centre de Recherches Pétrographiques Géochimiques – Nancy (France) • Supervisors: Laure Giamberini, Yves Marrocchi, Laetitia Minguez and Carole Cossu-Leguille

Collection and analysis of abiotic (water, sediment) and biotic (animals and plants) samples in **natural freshwater environment – Ecotoxicological assays** using the bivalve *Dreissena polymorpha* and the crustacean *Gammarus sp.* – **Analysis of Li isotope composition** in abiotic and biotic samples – **Analysis of the distribution of Li isotopes** in biological tissues by mass spectrometry imaging (LG-SIMS) – **Analysis of subcellular compartmentalization** of Li in biological tissues – **Modelling of Li toxicokinetic**

2018-2022 • **PHD STUDENT POSITION IN ECOTOXICOLOGY • Ecotoxicological assessment of rare earth elements (REE) in a freshwater food web: integrated approaches in indoor mesocosms •** *LIEC: Laboratoire Interdisciplinaire des Environnements Continentaux – Metz (France) • Supervisors: Laure Giamberini and Elisabeth Gross*

Performing normalised (ISO 8692, 2012 ; ISO 6341, 2012 ; OECD TG 238, 2014 ; OECD 126, 2010) and no normalised (**microcosms** and **mesocosms**) **ecotoxicological assays** using unicellular algae (*R. subcapitata*, *C. vulgaris*), macrophyte (*M. spicatum*), crustacean (*D. magna*), bivalve (*C. fluminea*) and fish (*D. rerio*) species – **Measuring biomarkers** at individual (growth, behaviour, mobility, mortality) and subindividual (activity of enzymes and compounds indicating antitoxic, antioxidant defences, energetic reserves and metabolism, osmo/iono-regulation, neurotoxicity, cellular damages) levels - Evaluation of the influence of **dissolved organic matter** on REE speciation, bioaccumulation and toxicity – **Speciation modelling** of metals in aqueous media (*Visual Minteq*) – **Management of cultivation** of *M. spicatum*

January-July 2018 • **INTERNSHIP IN ECOTOXICOLOGY RESEARCH • Biological effects and speciation of rare earth elements in freshwater media •**

LIEC: Laboratoire Interdisciplinaire des Environnements Continentaux – Metz (France) • Supervisors: Laure Giamberini and Sandrine Pain-Devin

Performing normalised **ecotoxicological assays** (ISO 8692, 2012 et ISO 6341, 2012) – **Management of cultivation and farm** of unicellular algae (*R. subcapitata*, *C. vulgaris*, *S. subspicatus*) and crustacean (*D. magna*)

April-July 2017 • **INTERNSHIP IN ECOTOXICOLOGY RESEARCH • Ecotoxicological effects of copper oxide nanoparticles (nCuO) at different levels of biological organisation using the freshwater and marine bivalves C. fluminea and S. plana •** *LIEC: Laboratoire Interdisciplinaire des Environnements Continentaux – Metz (France) in collaboration with MMS: Mer, Molécules, Santé – Angers (France) • Supervisor: Laure Giamberini*

Measuring biochemical biomarkers (activity of enzymes and compounds indicating antitoxic, antioxidant defences, energetic reserves and metabolism, cellular damages) – **Behaviour assays** (filtration, burrowing) on bivalves – **Mesocosm experiment in freshwater and marine water**

March-June 2016 • **INTERNSHIP IN ECOTOXICOLOGY RESEARCH • Effects of 4-nonylphénol on osmoregulation of sea bass D. labrax •** *MARBEAC: MARine Biodiversity and Conservation – Montpellier (France) • Supervisor: Emilie Farcy*

Observation of qPCR performing – Microcosm experiment

February-May 2016 • **INTERNSHIP IN PALEOECOLOGY RESEARCH** • *In situ* comparative study of past and current pollen and vegetation of Palavas coastline •

ISEM: Institut des Sciences de l'Evolution – Montpellier (France) • Supervisor: Serge Müller

Discovery of all aspects of research area: collection of samples *in situ*, floristic survey, pollen identification using microscope, data analysis and interpretation, oral presentation of results, publication of a scientific article in the journal *ORPAL Synthesis*

2015- 2016 • **MANAGER OF SCIENTIFIC PROJECT** • Research of bioindicators of soil metallic pollution and phytoremediation in the former mining site of Thoiras (France) •

Faculté des Sciences, University of Montpellier (France)

Design and management of a scientific project, contact with different actors, floristic survey (Braun-Blanquet method), metal quantification in soil samples (xrf analysis), quantification of carbonates and organic matter (loss of ignition method)

RESEARCH PROJECT INVOLVEMENT



2024-2025 GEOLICAN Lithium and Health-Environment: Geochemistry of Lithium in France and in Canada and its potential environmental risk

2023-2024 Project Labex Ressources of 21st century: Lithium and Environmental Health

2016-2022 ANR PRCI. Ecotoxicology of Rare Earth Elements in Aquatic Systems (ECOTREE)

COLLECTIVE ACTIONS & RESPONSIBILITIES



REVIEWING OF SCIENTIFIC ARTICLES for Environmental Sciences and Pollution Research (ESPR), Critical Reviews in Environmental Science and Technology (CREST) journals

MENTORING AND SUPERVISING 8 master students (French and international)

CO-CHAIRING SESSION “Progress in Knowledge of Rare Earth Elements” with Susanne Heise at SETAC Europe 33rd Annual Meeting (Dublin, Ireland) in 2023

SCIENCE OUTREACH

•Workshop leading at *Communication High School*, March 2024, Metz (France)

•Workshop (speed-searching and game board) leading at “*European Researchers’ Night*” 2023 in Metz (France)

•*My thesis in 180 seconds*, 2022. First prize of the jury University of Lorraine, semi-finalist France https://ultv.univ-lorraine.fr/video/I1694-nicolas-lachaux-impacts-ecotoxiques-des-elements-terres-rares-a-differents-niveaux-dorganisation-biologiques-1er-prix-du-jury/?old_url=true

•Workshop leading at « *Tous chercheurs* » (equivalent of “*Researchers at school*”), Vigie de l’eau, March 2021, Vittel (France)

ELECTED REPRESENTATIVE OF PHD STUDENTS in the Council of Otelio (Observatory of Earth and Environnement of the University of Lorraine) in 2020-2022

VOLUNTEER IN SUSTAINABLE DEVELOPMENT ASSOCIATION of the Faculty of Fundamental and Applied Sciences of the University of Lorraine in 2021-2024

AWARDS AND RECOGNITION



- 2023 **Thesis award** (*Observatory of Earth and Environnement of the University of Lorraine, Otelo*)
2023 **Poster award** (*Young Researchers Days of the French Society of Stable Isotopes, SFIS*)
2022 **First prize of the jury** University of Lorraine, semi-finalist France (*My Thesis in 180 seconds*)
2022 **Oral presentation award** (*French Society of Applied Ecotoxicology, SEFA*)
2019 **Poster award** (*Docday of Laboratoire Interdisciplinaire des Environnements Continentaux, LIEC*)

SCIENTIFIC VALORISATION



PEER-REVIEW PUBLICATIONS

- 4) **Lachaux, N.**, Cossu-Leguille, C., Zaffino M., Simon C., Beuret M., Giamberini, L., Minguez, L., 2024. *Health check-up of a freshwater bivalve exposed to lithium*. Environmental Pollution, 367, 125573. doi:10.1016/j.envpol.2024.125573
<https://www.sciencedirect.com/science/article/pii/S0269749124022905?dgcid=author>
- 3) **Lachaux, N.**, Otero-Farina, A., Minguez, L., Sohm, B., Rétif, J., Châtel, A., Poirier, L., Devin, S., Pain-Devin, S., Gross, E.M., Giamberini, L., 2023. *Fate, subcellular distribution and biological effects of rare earth elements in a freshwater bivalve under complex exposure*. Science of Total Environment, 905, 167302. doi:10.1016/j.scitotenv.2023.167302
https://www.sciencedirect.com/science/article/abs/pii/S0048969723059296?dgcid=rss_sd_all
- 2) **Lachaux, N.**, Cossu-Leguille, C., Poirier, L., Gross, E.M., Giamberini, L., 2022. *Integrated environmental risk assessment of rare earth elements mixture on aquatic ecosystems*. Frontiers in Environmental Science 10:974191. doi: 10.3389/fenvs.2022.974191
<https://www.frontiersin.org/articles/10.3389/fenvs.2022.974191/full>
- 1) **Lachaux, N.**, Catrouillet, C., Marsac, R., Poirier, L., Pain-Devin, S., Gross, E.M., Giamberini, L., 2022. *Implications of speciation on rare earth element toxicity: A focus on organic matter influence in Daphnia magna standard test*. Environmental Pollution 307, 119554.
doi:10.1016/j.envpol.2022.119554
<https://www.sciencedirect.com/science/article/abs/pii/S0269749122007680>

In preparation:

- Lachaux, N.**, Berns, S., Poirier, L., Giamberini, L., Gross, E.M., *An alternative method for a more reliable assessment of REE toxicity on plants using standard tests.*
- Lachaux, N.**, Junique, L., Devin, S., Cambier, S., Minguez, L., Sohm, B., Chatel, A., Poirier, L., Pain-Devin, S., Gross, E.M., Giamberini L., *Fate, accumulation and biological effects of rare earth element mixtures in a model freshwater food web.*

ORAL PRESENTATIONS

- 6) **Lachaux N.**, Minguez L., Beuret M., Cossu-Leguille C., Giamberini L. (2024). *Présence et bioaccumulation du lithium dans les écosystèmes d'eau douce*, Journées Scientifiques Zone Atelier Moselle 2024, 22-23rd of May 2024, Nancy (France).
- 5) **Lachaux N.**, Gross E., Giamberini L (2022). *Ecotoxicological impacts of Rare Earth Elements at different biological organization levels in a freshwater foodweb using integrated approaches in indoor mesocosm*. Summer School of Panorama Project, 31st of October – 4th of November 2022, Hamburg (Germany). **Invited as speaker.**
- 4) **Lachaux N.**, Gross E., Giamberini L (2022). *Evaluation du risque environnemental des Elements Terres Rares (ETR) dans les écosystèmes aquatiques*. Colloque de la Société d'Ecotoxicologie Fondamentale Appliquée, 30th of June – 1st of July 2022, Metz (France). **Oral Presentation award** (FCS Rovaltain)
- 3) **Lachaux N.**, Catrouillet, C., Marsac, R., Poirier, L., Pain-Devin, S., Gross, E.M., Giamberini, L. (2022). *Implications of speciation on rare earth element toxicity: a focus on organic matter influence in Daphnia magna standard test*, SETAC Europe 32th Annual Meeting, Towards a Reduced Pollution Society, 15-19th of May 2022, Copenhagen (Denmark).

- 2) **Lachaux N.**, Chatel A., Devin S., Groenenberg J. E., Gutleb A., Mouneyrac C., Otero-Fariña A., Pain-Devin S., Poirier L., Zalouk-Vergnoux A., Gross E. M., Giamberini L. (2020). *Integrated ecotoxicological assessment of Rare Earth mixtures in freshwater bivalve*, SETAC Europe 30th Annual Meeting, Open Science for Enhanced Global Environmental Protection., 3-7th of May 2020, online
- 1) **Lachaux N.**, Cossu-Leguille C., Sohm B., Pauly D., Bojic C., Fouque C., Poirier L., Pain-Devin S., Gross E. M., Giamberini L. (2019). *Ecotoxicological assessment of Rare Earth Elements for aquatic ecosystems by normalized assays*, Rare earth elements supply: challenges and perspectives, 8-10th of October 2019, Nancy (France)

POSTER PRESENTATIONS

- 12) **Lachaux N.**, Minguez L., Lê M., Sohm B., Beuret M., Cossu-Leguille C., Marrocchi Y., Giamberini L. (2024). *Occurrence, fate and of lithium in freshwater ecosystems: implication for its environmental risk assessment*, SETAC Europe 34th Annual Meeting, Science-Based Solutions in Times of Crisis: Integrating Science and Policy for Environmental Challenges, 5-10th of May 2024, Seville (Spain).
- 11) **Lachaux N.**, Minguez L., Cossu-Leguille C., Marrocchi Y., Giamberini L. (2023). *Occurrence, fate, transfer of lithium isotopes in freshwater ecosystems: implication for its environmental risk assessment*, Groupe de Recherche en Ecotoxicologie Aquatique, 5-7th of December 2023, Metz (France).
- 10) **Lachaux N.**, Minguez L., Cossu-Leguille C., Marrocchi Y., Giamberini L. (2023). *Occurrence, fate, transfer of lithium isotopes in freshwater ecosystems: implication for its environmental risk assessment*, Journées Jeunes Chercheurs de la Société Française des Isotopes Stables (SFIS), 14-15th of November 2023, Strasbourg (France). **Poster Presentation award**
- 9) **Lachaux N.**, Junique L., Devin S., Cambier S., Sohm B., Châtel A., Poirier L., Pain-Devin S., Gross E., Giamberini L. (2023). *Fate and biological effects of Rare Earth Element mixtures in a model freshwater food web*, SETAC Europe 33th Annual Meeting, Data-Driven Environmental Decision-Making, 30th of April – 4th of May 2023, Dublin (Ireland).
- 8) **Lachaux N.**, Junique L., Cambier S., Sohm B., Pauly D., Zaffino M., Devin S., Gross E., Giamberini L. (2022). *Integrative ecotoxicological assessment of Rare Earth Elements (REE) on a model community*, SETAC Europe 32th Annual Meeting, Towards a Reduced Pollution Society, 15-19th of May 2022, Copenhagen (Denmark).
- 7) **Lachaux N.**, Berns S., Junique L., Cambier S., Devin S., Giamberini L., Gross E. (2022). *Ecotoxicological assessment of Rare Earth Elements (REE) on the submerged macrophyte Myriophyllum spicatum*, SETAC Europe 32th Annual Meeting, Towards a Reduced Pollution Society, 15-19th of May 2022, Copenhagen (Denmark).
- 6) **Lachaux N.**, Junique L., Cambier S., Sohm B., Pauly D., Zaffino M., Devin S., Gross E., Giamberini L. (2021). *Integrative ecotoxicological assessment of Rare Earth Elements (REE) on a model community*. Colloque d'Ecophysiologie Animale, 5eme édition, 2nd – 4th of November 2021, Montpellier (France)
- 5) **Lachaux N.**, Sohm B., Cossu-Leguille C., Bojic C., Fouque C., Pauly D., Pain-Devin S., Gross E. M., Giamberini L. (2019). *Ecotoxicology of Rare Earth Elements (REE) in continental aquatic systems: biological effects and speciation*, DocDay LIEC, 15th of June 2019, Nancy (France). **Poster award**
- 4) **Lachaux N.**, Sohm B., Cossu-Leguille C., Bojic C., Fouque C., Pauly D., Pain-Devin S., Gross E. M., Giamberini L. (2019). *Ecotoxicology of Rare Earth Elements (REE) in freshwater systems: behaviour and biological effects*, SETAC Europe 29th annual meeting. One environment. One health. Sustainable societies, 26–30th of May 2019, Helsinki (Finland)
- 3) **Lachaux N.**, Sohm B., Cossu-Leguille C., Bojic C., Fouque C., Pauly D., Pain-Devin S., Gross E. M., Giamberini L. (2019). *Ecotoxicology of Rare Earth Elements (REE) in continental aquatic systems: biological effects and speciation*, COST Action TD 1407 Technological Critical Elements: Sources, Chemistry and Toxicology, 2nd – 3rd of April 2019, Zagreb (Croatia).
- 2) **Lachaux N.**, Pain-Devin S., Giamberini L. (2019). *Ecotoxicology of Rare Earth Elements (REE) in freshwater systems: behaviour and biological effects*, COST Action TD 1407 Solution Chemistry of TCEs, 22nd – 23rd of January 2019, Bialystok (Poland)
- 1) **Lachaux N.**, Pain-Devin S., Gross E. M., Giamberini L. (2018). *Ecotoxicologie des éléments terres rares dans les milieux aquatiques continentaux*, Cycle biogéochimique des Métaux, 2nd – 4th of October 2018, Nancy (France)