TITLE OF THE INTERNSHIP

Influence of the different environmental contexts of two French Guiana estuaries (Sinnamary and Mahury) on the diversity of the meiofauna, taking into account local and regional characteristics

LAB & PEOPLE

Name of the hosting lab: Laboratory of Marie Environmental Sciences (LEMAR)
General activities of the lab: LEMAR is an interdisciplinary lab, where ecologists, biologists, biogeochemists, chemists, physicians, economists and social science scientists work together. LEMAR scientists work on fundamental research, sustainable development and innovation without forgetting the economic and the social consequences of all marine-related activities. LEMAR includes three leading research groups: "Panorama" working on physiology and adaptation of marine organisms from genes to population; "Discovery" working on marine ecology, diversity, structure, dynamics and functioning of marine ecosystems, and "Chibido" working on marine chemistry, biogeochemical cycles and ocean dynamics.
Website: https://www-iuem.univ-brest.fr/lemar/
Number of staff / PhD: 150 researchers and technicians; 50 PhD candidates
Supervisor name and contact: Adriana Spedicato, PhD candidate (spedicato@univ-brest.fr); Emma Michaud, CNRS researcher (emma.michaud@univ-brest.fr), Gérard Thouzeau, CNRS researcher (gerard.thouzeau@univ-brest.fr)

TOPIC OF THE INTERSHIP

Scientific context of the internship (max 20 lines):
Mangrove forests thrive in the intertidal area along estuaries, coastlines and lagoons between 30°N and 30°S. Strong salinity, pH and oxygen content variations occur daily and seasonally in mangroves. In French Guiana (FG), this environmental variability is forced by the huge depositional/erosional dynamics of mudbanks along the littoral originating from the Amazon River. Mangroves rapidly colonize those coastal sediments, but their decline is as fast as the migration of the mudbank after erosion. In contrast, along FG estuaries, mangroves form stable adult forests of *Avicennia spp*, which spread several km inland due to marine saltwater penetration. Hence, two gradients determine the distribution of estuarine mangrove forests: a salinity gradient from the sea to the land and a tidal gradient perpendicular to the estuary. Meiofauna, which includes metazoans ranging from 32 µm to 1 mm size, inhabits mangrove muddy sediments. At local estuarine scale, its density and diversity vary according to abiotic (granulometry, salinity, pH, redox potential, etc.) and biotic factors (organic matter, biotic interactions, etc.), which depend on the presence/absence of mangroves and the geomorphology of the area. During this internship, the student will determine the influence of the different environmental contexts of two FG estuaries (Sinnamary and Mahury) on the diversity of meiofauna, taking into account local and regional characteristics.

Keywords
Mangroves, Estuaries, French Guiana, Meiofauna, Diversity

Bibliography

Fromard, F., Puig, H., Mougin, E., Marty, G., Betoulle, J. L., and Cadamuro, L. (1998). Structure, above-ground biomass and dynamics of mangrove ecosystems: New data from French Guiana. *Oecologia* 115, 39–53. doi:10.1007/s004420050489.

Fromard, F., Vega, C., and Proisy, C. (2004). Half a century of dynamic coastal change affecting mangrove shorelines of French Guiana . A case study based on remote sensing data analyses and field surveys. 208, 265–280. doi:10.1016/j.margeo.2004.04.018.

Giere, O. (2009). *Meiobenthology: The microscopic motile fauna of aquatic sediments*. 2nd ed. Berlin, Heidelberg: Springer doi:10.1007/978-3-540-68661-3.

Lee, S. Y., Primavera, J. H., Dahdouh-Guebas, F., Mckee, K., Bosire, J. O., Cannicci, S., et al. (2014). Ecological role and services of tropical mangrove ecosystems: A reassessment. *Glob. Ecol. Biogeogr.* 23, 726–743. doi:10.1111/geb.12155.

Michaud, E., Aschenbroich, A., Gauthier, O., Fromard, F., Aller, J. Y., Aller, R. C., et al. (2022). The Codevelopment of Mangroves and Infaunal Community Diversity in Response to the Natural Dynamics of Mud Deposition in French Guiana. *Sustain.* 14. doi:10.3390/su14052829.

Michelet, C., Zeppilli, D., Hubas, C., Baldrighi, E., Cuny, P., Dirberg, G., et al. (2021). First assessment of the benthic meiofauna sensitivity to low human-impacted mangroves in French Guiana. *Forests* 12. doi:10.3390/f12030338.

Schratzberger, M., and Ingels, J. (2018). Meiofauna matters: The roles of meiofauna in benthic ecosystems. *J. Exp. Mar. Bio. Ecol.* 502, 12–25. doi:10.1016/j.jembe.2017.01.007.

Somerfield, P. J., and Warwick, R. M. (2013). "Meiofauna Techniques," in *Methods for the Study of Marine Benthos*, 253–284. doi:10.1002/9781118542392.ch6.

Zeppilli, D., Leduc, D., Fontanier, C., Fontaneto, D., Fuchs, S., Gooday, A. J., et al. (2018). Characteristics of meiofauna in extreme marine ecosystems: a review. *Mar. Biodivers.* 48, 35–71. doi:10.1007/s12526-017-0815-z.

- **Tasks and duties entrusted to the student**: The student will extract the meiofauna from the replicate sediment cores sampled along three transects (two at Sinnamary and one at Mahury); sort it under a stereomicroscope; count, measure and identify each metazoan at phylum level. Then, the student will perform the statistical analyses of the data and will discuss the results with the supervisors of the internship.

- **Skills to be acquired or developed**: The student should acquire expertise in the different steps of processing meiofaunal samples, a good ability to identify taxa, a good knowledge of the ecology of the different meiofaunal taxa and, on the estuarine mangroves of FG, a good understanding of the statistical tools to be applied to correctly analyse the data. A critical approach to the subject of study will allow him/her to understand the underlying scientific issues.

2023 Master internship at UBO

PROFILE OF THE DESIRED STUDENT

- **Minimum level of study required**: Master of Science
- **Field(s) of study**: Marine/Freshwater Biology, Marine/Freshwater Ecology
- **Scientific skills**: We strongly suggest a basic knowledge of the main taxa of meiofauna, their appearance under the stereomicroscope, as well as a first approach to the laboratory tools and methods needed to process sediment samples. Theoretical knowledge of statistical tools for diversity analysis and experience with R software would be appreciated.
- **Language skills required:** the student must have a good knowledge of written and spoken English or French for daily communication with supervisors, as well as written and spoken English for literature searches and discussions.

THE INTERNSHIP ASSIGNMENT:

Desired duration of the internship (in months): 5 months
Desired Starting date of the mission: between 01/02/2023 and 28/02/2023
Indicative weekly schedule: *35h / week*
Remuneration: 600€/month, paid on French SEA-EU funds for a maximum of 5 months; additional Erasmus grant could be asked to your own university.

Internship agreement: *an internship agreement will be signed.*

To SEA-EU students:
If you're interested please send your CV and letter of motivation to the scientist in charge, spedicato@univ-brest.fr before the date 23/01/2023.