

1st Rufford Small Grant

Project: Plastic pollution influence over mangrove ecosystems from Southeast Brazil
ID: 39538-1

Name of leader: Luiz Eduardo de Oliveira Gomes

Project Update: April 2024 (report 2)

General information

We collected 3 sampling stations at the Piraquê Açú-Mirim estuary on the Southeast Brazilian coast (ES: state of Espírito Santo, 19°57'S, 40°10'W; PA: Piraquê-Açú, PM: Piraquê-Mirim, and Conf: Confluence). At each station, we sampled one core at the mudflat (1m distant from the mangrove fringe) and inside the mangrove forest (~10m distant from the mangrove fringe). These samples are being analyzed as part of Bethânia Dal Col Lehrback PhD thesis (Supervisor Fabian Sá, Co-Supervisor Luiz Eduardo de O. Gomes). Furthermore, we contracted local community members to support us during the fieldwork along the mangrove forests.

Daniela Gadens Zanetti is a new collaborator developing part of her PhD thesis (Supervisor Fabian Sá, Co-Supervisor Luiz Eduardo de O. Gomes) that investigates the potential burial of microplastics between different blue carbon ecosystems along the Brazilian coast. By this, it was possible to include samples from mangroves (one core ~10m distant from the mangrove fringe) and saltmarshes (two cores from the middle of the bank) from Todos os Santos bay (BA: state of Bahia) in our project to enhance our range assessment.

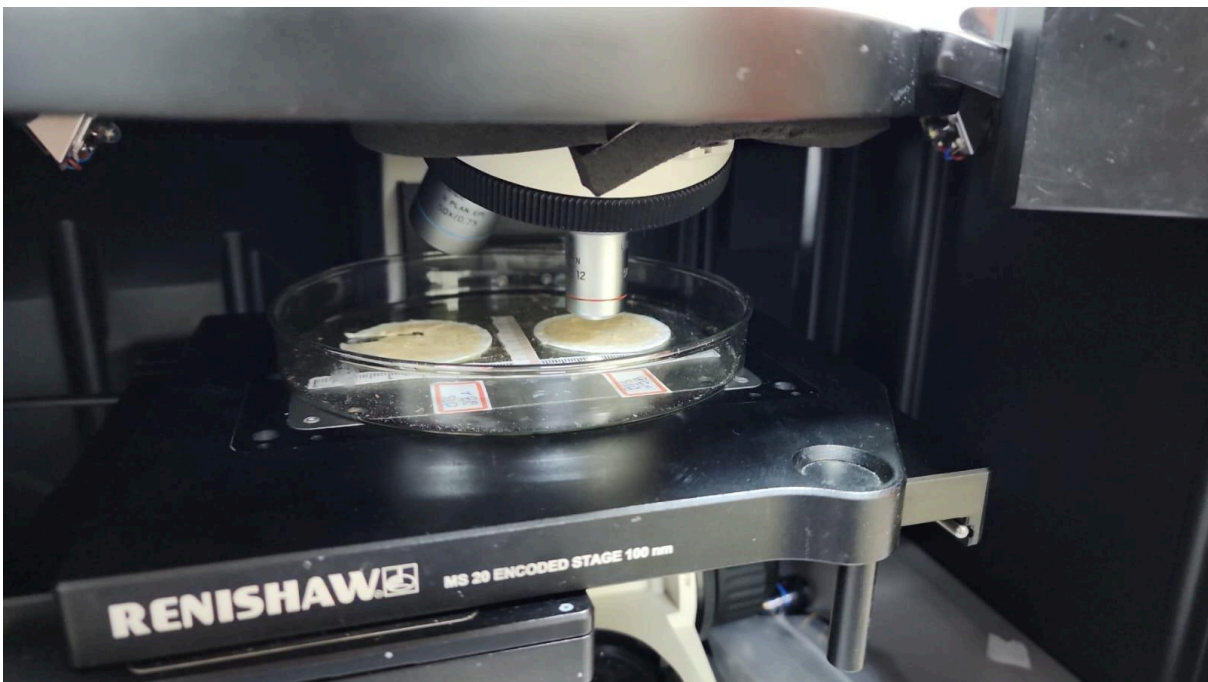
We still need to sample at Guanabara bay. Two boats of the Guardiões do Mar NGO broke during our project timeframe, making it difficult to conclude this goal; despite this, we will do the needed sampling efforts at Guanabara bay by the end of July 2024. Here we will sample the 6 circular plots for mangrove forest assessment and sample at least one sediment.

It was not possible to use the FTIR proposed for this study due to local bureaucracy after the equipment breaks. To solve it, we are adapting our methodology to the use of a Raman Spectroscopy Analyzer at Universidade Federal de Viçosa with the support of the new collaborators (Professors André Luiz Lopes de Faria, and Eduardo Nery Duarte de Araújo), which are supporting Daniela Gadens Zanetti in the analyses of the Piraquê-Açú and Piraquê-Mirim sediment cores from mangroves, and the sediment cores from the mangrove and saltmarshes from Bahia.

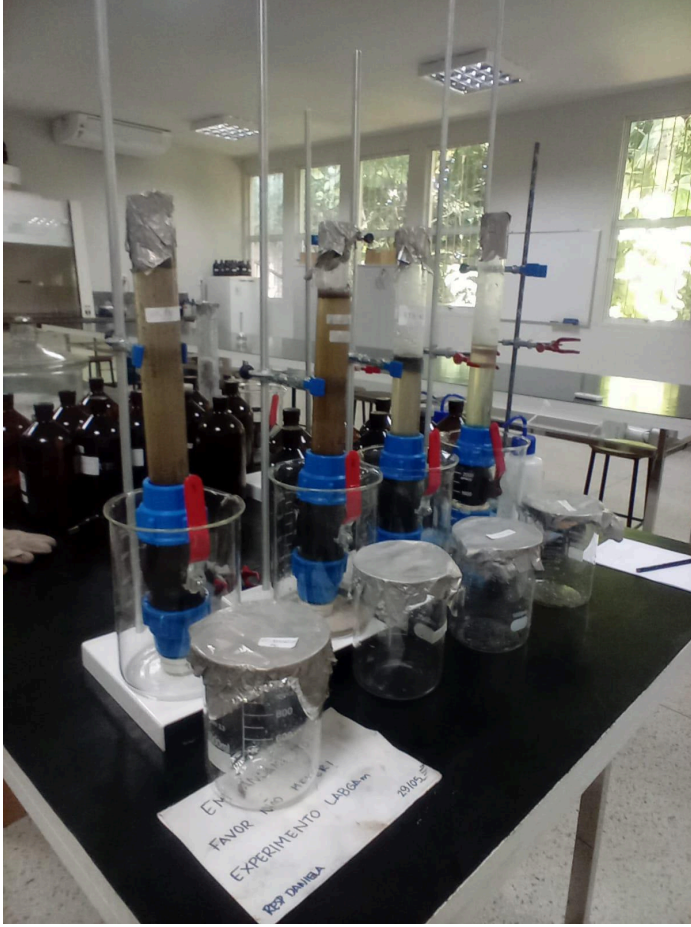
From the proposed six mangrove ecosystems (mangrove forests: 6 cores; nearby tidal flats: 6 cores; Total of 12 cores) under contrasting conservation levels, we analyzed 5 cores (mangrove forests: 3 cores; salt marshes: 2 cores). We still have 1 mangrove core and 3 tidal flats cores under analysis in the lab. Furthermore, based on the intense effort needed to process each sediment core due to the huge amount of organic matter, it was possible to include one extra topic in our research. So, we are monitoring the solid waste pollution on mangrove soils at Piraquê Açú-Mirim, which is part of a long-term monitoring effort that I started in 2018 and stopped during the COVID pandemic.



Images of the Laser Raman Spectrometer from Professors André Luiz Lopes de Faria, and Eduardo Nery Duarte facilities at Universidade Federal de Viçosa. Laser Raman is a non-destructive technique that provides detailed information about the sample's chemical composition (main plastic polymer composition).



Example of our samples being analyzed by the Laser Raman Spectrometer.



Sediment-Microplastic Isolation (SMI) unit is being used to isolate the plastic debris from the sediment by flotation. Analyses conducted at Sá' lab.



An image of one of the fishing nets used by crab catchers that we sampled during our long-term monitoring effort.

Social media

In X social media (<https://twitter.com/>), we created the Healthy Seascape Initiative (@HealthySeascape) to post our activities and share other pieces of information about blue carbon ecosystems conservation, mostly mangroves and salt marshes. Up to now, we have 95 posts and 34 followers.



The screenshot shows the profile page for 'Healthy Seascape Initiative' on X. At the top, there is a back arrow, the profile name 'Healthy Seascape Initiative', and '95 posts'. The profile picture is a brown circle with a white letter 'H'. The cover photo features the 'Guardiões do Mar' logo (a green hand holding a white bird) and the text 'Healthy Seascape Initiative' in large blue letters. Below the profile picture is a button that says 'Editar perfil'. The bio reads: 'Researching Nature-Based Solutions for a #HealthySeascape! This a Guardiões do Mar - Guanabara Verde initiative supported by Rufford Foundation!'. Location is 'Sudeste/Leste, Brasil' and the website is 'guardioesdomar.org.br/projetos/health...'. It was created in June 2023. There are 196 people following and 34 followers.

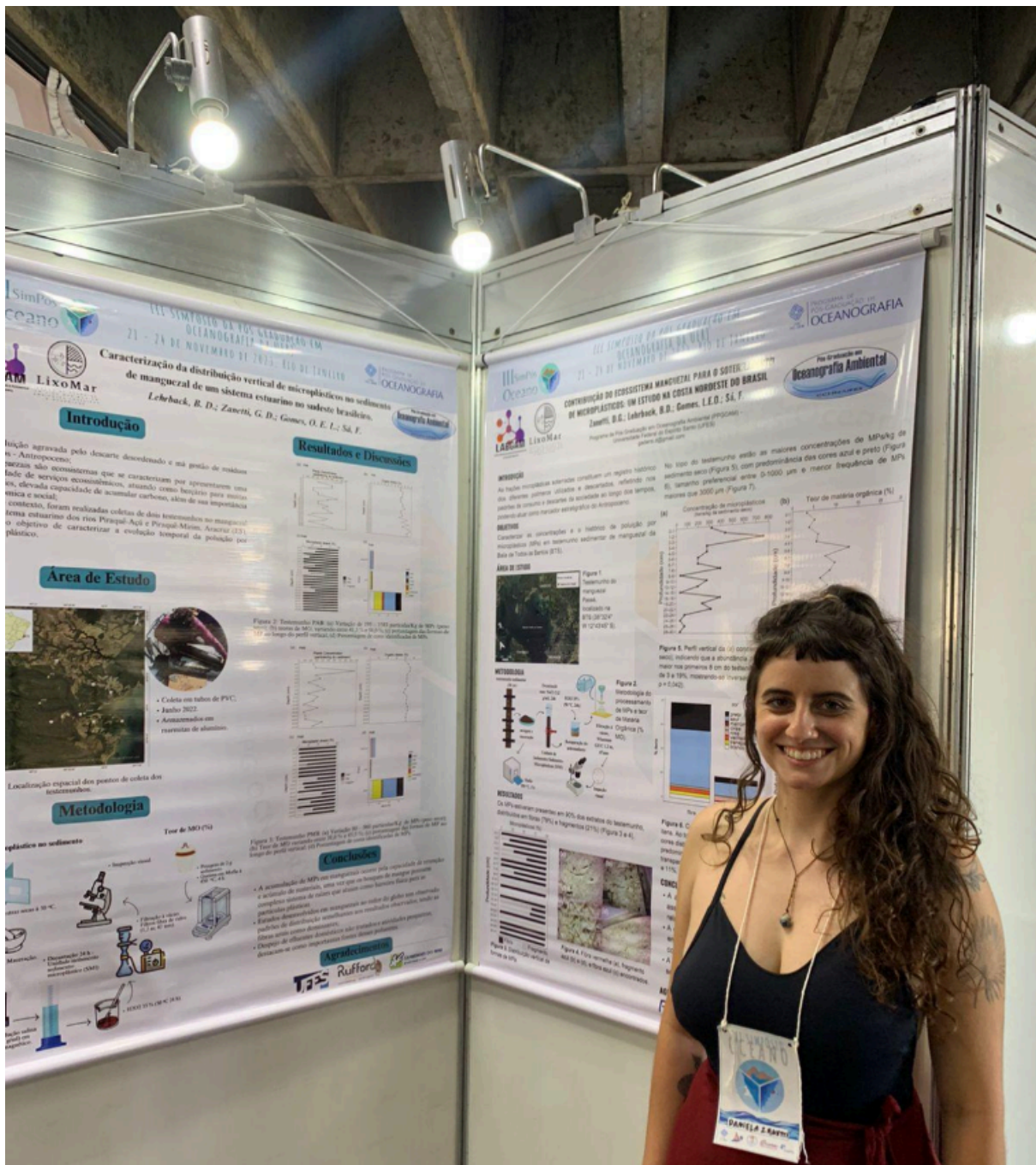
Furthermore, the NGO Guardiões do Mar website is working again, and we created a folder related to our project which still needs some improvements (<https://guardioesdomar.org.br/projetos/healthy-seascape-initiative/>).



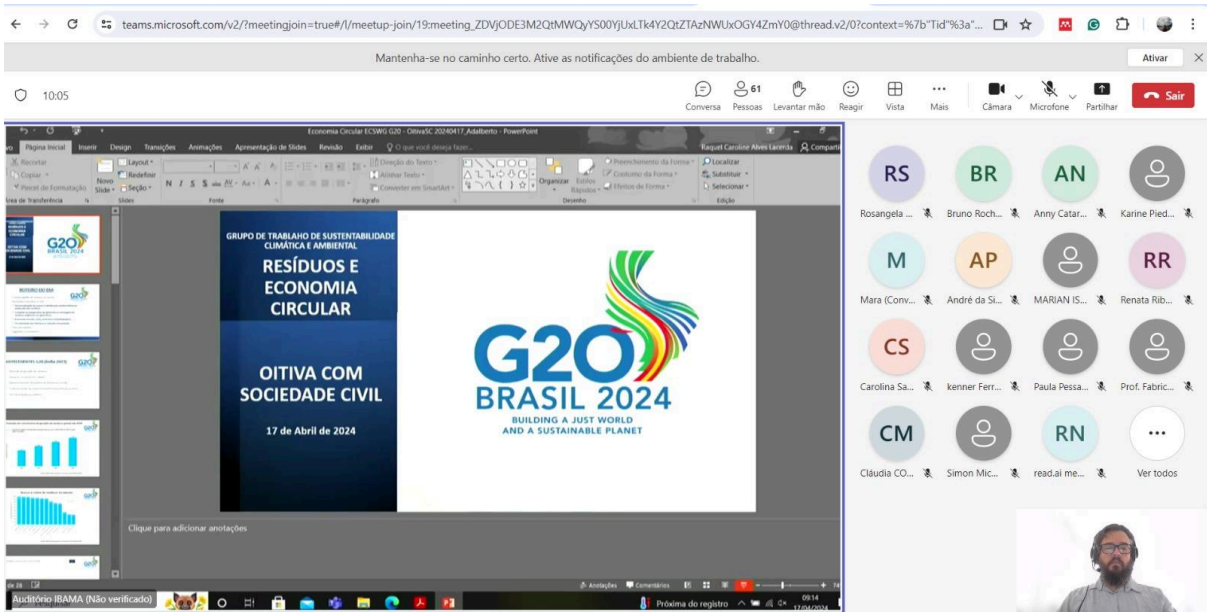
The screenshot shows the project page for 'Healthy Seascape Initiative' on the website 'guardioesdomar.org.br/projetos/healthy-seascape-initiative/'. The website header includes the 'Guardiões do Mar' logo and navigation links for 'Sobre', 'Projetos', 'Trilhas', 'Notícias', and 'Contato'. The main content area features a large image of a mangrove landscape. The title 'Healthy Seascape Initiative' is prominently displayed. The text describes the project as a pioneering research aimed at investigating the impacts of human and climatic actions on coastal and marine ecosystems in Brazil. It mentions the evaluation of solid waste effects on mangrove structure and the accumulation of microplastics. The research is conducted through field activities and laboratory analyses in collaboration with the Federal Universities of Espírito Santo (Dr. Fabian Sá) and Universidade Federal Fluminense (Dr. Humberto Marotta). The project runs from April 2023 to April 2024. A small 'X' icon is visible, and the funding source is listed as 'The Rufford Foundation (Inglaterra)'.

Materials and presentation of this project

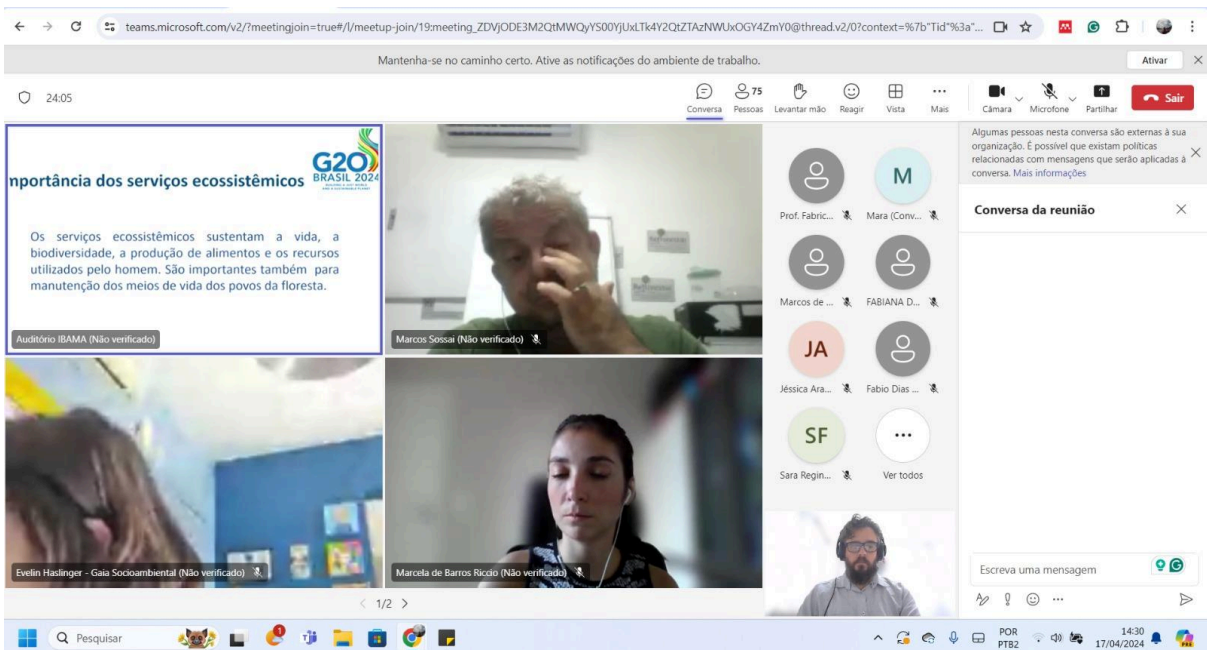
Besides social media, we share information from our project during in-person activities such as congresses, meetings, talks, and classes.



The project was presented to the scientific community at III Simpósio do Programa de Pós Graduação em Oceanografia da UERJ: Oceanografia Sustentável, where Daniela presented the results from her PhD; as well as the results from Bethânia PhD.



Luiz Gomes participated in the Brazilian meeting about solid waste and circular economy to support the Brazilian committee in the G20 meeting. Here the talk involved scientists, the government, and other interesting parties of the society.



Luiz Gomes participated in the Brazilian meeting about ecosystem and environmental services to support the Brazilian committee in the G20 meeting. Here the talk involved scientists, the government, and other interesting parties of the society.



Luiz Gomes presented his talk at the “[1º Congresso Nacional de Manguezais](#)” (1st National Mangrove Congress, Brazil) about the impacts that mangrove ecosystems suffer due to land use and cover change, climate change, emerging pollutants, as well as the global importance of their restoration and conservation.



Next steps

Sampling the needed mangrove forest structure assessment and sediment core at Guanabara bay (state of Rio de Janeiro);

Keep the lab analyses of the sediment cores in Sá's lab and at the facilities provided by Professors André Luiz Lopes de Faria and Eduardo Nery Duarte;

Keep the training of students and others interested in the theme, and spread the state-of-the-art (e.g. education activities) of plastic debris pollution across Brazilian coastal ecosystems;

The submission of a scientific article about plastic pollution in mangrove ecosystems (up to July 2024);

Participate or organize a meeting with interested parties to show our results and discuss strategies for plastic pollution mitigation (from local to national level).