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MARIPOLDATA Ocean Seminar

"Conservation and Use of the Ocean Genome"

8th December, 2021

Guest Speaker: Dr. Robert Blasiak

Robert Blasiak is a researcher at the Stockholm Resilience Centre, where he co-leads the Centre's "Human Ocean" research theme and leads the FORMAS project "The marine biotechnology industry and equitable governance of marine genetic resources". In the context of marine genetic resources, he has co-led several international collaborations, including for the Blue Climate Initiative, the World Ocean Assessment and the High Level Panel for a Sustainable Ocean Economy. He is a visiting researcher at the University of Tokyo and was previously a NEREUS research fellow funded by the Nippon Foundation.

Reading Material for the Session:

Blasiak, R., Wynberg, R., Grorud-Colvert, K. et al. The ocean genome and future prospects for conservation and equity. *Nat Sustain* 3, 588–596 (2020). <https://doi.org/10.1038/s41893-020-0522-9>

Claudet, J., Amon, D. J., & Blasiak, R. (2021). Opinion: Transformational opportunities for an equitable ocean commons. *Proceedings of the National Academy of Sciences*, 118(42), e2117033118. <https://doi.org/10.1073/pnas.2117033118>

The monthly **MARIPOLDATA Ocean Seminar Series** offer a virtual space to get information and engage in exchanges on ocean governance issues, through presentations by international experts from academia, governments, international organisations and civil society.

To register: Please contact ina.tessnow-vonwyssocki@univie.ac.at, indicating your name and institution.

More information: [MARIPOLDATA Ocean Seminar Series](#)

The MARIPOLDATA Ocean Seminar Series is part of the MARIPOLDATA project which has received funding from the European Research Council under the Horizon 2020 research and innovation programme (No 804599).

1. General Context

- Marine Genetic Resources Governance in areas beyond national jurisdiction lacks regulation
- A new legally binding agreement for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction (BBNJ) seeks to fill this gap by addressing the access and benefit-sharing of MGRs
- The final round of the BBNJ negotiations was postponed several times due to the Covid-19 pandemic, but is supposed to be finalised early 2022
- There are simultaneous discussions about the fair and equitable sharing of genetic resources that fall within national jurisdiction

2. Introduction

Readings:

Blasiak, R., Wynberg, R., Grorud-Colvert, K. et al. The ocean genome and future prospects for conservation and equity. *Nat Sustain* 3, 588–596 (2020). <https://doi.org/10.1038/s41893-020-0522-9>

Claudet, J., Amon, D. J., & Blasiak, R. (2021). Opinion: Transformational opportunities for an equitable ocean commons. *Proceedings of the National Academy of Sciences*, 118(42), e2117033118. <https://doi.org/10.1073/pnas.2117033118>

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Ina Tessnow- von Wysocki, December 2021

Introduction to MGRs in ABNJ

This MARIPOLDATA Ocean Seminar brought together academics who research on, with and about marine genetic resources (MGRs) and interested people new to the topic of marine genetic resources, as well as some who are actively involved in negotiations on the international level regarding the access to and sharing of the benefits deriving from genetic resources.

Drawing on the first Ocean Seminar with Konrad Marciniak on the Legal Status of Marine Genetic Resources in areas beyond national jurisdiction, this Seminar is focusing on the “Ocean Genome” and connecting equity questions in upcoming international negotiations. This topic is still on top of the governance agendas, and discussed in several fora. Many unresolved issues remain despite an interactive intersessional period among state delegated and non-governmental organisations, and we decided to convene a few more sessions on this topic. After this Ocean Seminar, we will discuss traceability of Marine Genetic Resources with Fran Humphries (January 26th 2022).

While humans are aware of the environmental significance of marine genetic resources, yet, the deep sea is largely unexplored and unknown to us. Since the 1960s, marine genetic compounds have been used to develop products, and are today the source of a number of pharmaceutical, biofuel or cosmetic products. This shows how our lives are intertwined with this concept of marine genetic resources. Any yet, while this gives a better idea what MGRs are and can be, MGRs in areas beyond national jurisdiction are currently not regulated under existing international agreements.

Many existing agreements are relevant to the governance of MGRs. These include the Convention on Biological Diversity (CBD), its Nagoya and Cartagena Protocols, the International Treaty on Plant Genetic Resources for Food and Agriculture, the United Nations Convention on the Law of the Sea (UNCLOS) and the World Intellectual Property Organisation (WIPO).

While the Convention on biological diversity, with its Nagoya Protocol, regulates benefit-sharing of genetic resources found *within* national jurisdiction- MGRs *beyond* national jurisdiction are not subject to any legal mechanism for access and benefit sharing to date- which is supposed to be addressed with the BBNJ negotiations.

The topic of genetic resources and questions about the fair and equitable sharing of benefits link discussions of the different fora - where negotiations are happening simultaneously: On the one hand the [Open-Ended Working Group session of the CBD](#) with the upcoming Conference of the Parties (COP) meeting that will hopefully in the beginning of 2022 agree on a post-2020 global biodiversity framework; and on the other hand the ongoing negotiations for a legally binding instrument under UNCLOS (the United Nations Convention on the Law of the Sea) for the conservation and sustainable use of marine biodiversity beyond national jurisdiction (BBNJ).

This trigger the question: What counts as a genetic resource - and which benefits need to be shared and how? These discussions are not new and ongoing but have over the past decades - with

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advancements in research and technology - been looking at new topics, e.g. digital sequence information.

The BBNJ negotiations regard marine genetic resources in areas *beyond* national jurisdiction, which is a particular case, as these areas count as “global commons”. This means, they are no-one’s and everyone’s at the same time, which spurs discussions on who can claim ownership over resources and their resulting products.

Why do we see these discussions coming up and why are they so relevant? Well, it is suggested that commercial interest in MGRs is growing, when looking at the increasing number of patents. Access to MGRs is unevenly spread across the globe, as it requires financial capacity and technology that is not available to all states. Robert Blasiak explored in an earlier work, that more than 90% of all patents are owned by only 10 countries alone- the top three states owning patents being- US, Germany and Japan (around 70%). This implies that the benefits from MGRs are currently unevenly shared across nations. This brings with it ethical implications and calls for capacity-building and the transfer of marine technology to support to close this gap.

In this seminar, Robert Blasiak described the concept of the ocean genome, the benefits it provides, the threats it faces, and prospects for increasing equity in the context of ongoing international processes.

Suggestions for transformational change in a few actions and ideas how to achieve equity in our ocean can be provided.

3. Conservation and Use of the Ocean Genome

Presentation by **Dr. Robert Blasiak**

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4. Questions and Discussion

What is the potential of MGRs in BBNJ..?

There is the assumption that MGRs in BBNJ carry a lot of potential for development of products, however, research in the deep sea is costly, there is no guarantee of profits and product development may take several decades to complete. While many actors have the vision of profitable MGRs in ABNJ, the actual value of MGRs remains unclear.¹ Robert Blasiak suggests that research needs to be encouraged, even if little benefit is expected. Curiosity in science helps our understanding of the ocean to better protect and use it. Science can contribute to transformative opportunities² and shifts in the mindsets, as there are many relationships we can have with the ocean, from *exploring* and understanding, to *exploiting* the resources or *protecting* prestige ecosystems.

Science-Policy in BBNJ

Discussions included questions on scientific advice for negotiators in BBNJ, regarding MGRs. While it is important to include scientists, there is still the need to identify how such inclusion can be done most effectively. Robert Blasiak emphasises the need for multidisciplinary in negotiating MGR issues: Legal experts are needed to advise on how the draft text should be phrased and scientific experts from the field of biotechnology for instance, “who understand the science behind it”, such as aspects of sequences and technology. There are knowledge gaps in some regions/countries on the issue of MGRs that prevent the full understanding of the package element for the new treaty. Ocean Seminar participants from governments and NGOs suggested workshops, presentations like the MARIPOLDATA Ocean Seminar and explanatory videos to support knowledge on MGRs in BBNJ. Engaging science and diplomacy was also mentioned regarding environmental governance beyond the BBNJ negotiations, such as, for instance, the conference of the parties (COP) meetings of the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) for the adoption of the post-2020 global biodiversity framework.

¹ See also: Tiller, R., De Santo, E. M., Mendenhall, E., Nyman, E., and Ralby, I. (2020). Wealth blindness beyond national jurisdiction. *Mar. Pollut. Bull.* 151:110809. doi: 10.1016/j.marpolbul.2019.110809
<https://www.sciencedirect.com/science/article/abs/pii/S0025326X19309658?via%3Dihub>

² <https://www.blueclimateinitiative.org/working-groups/mineral-and-genetic-resources>

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Equity in BBNJ

Equity in BBNJ has various dimensions in the BBNJ agreement and constitutes a main pillar for many developing countries particularly. While negotiators often mention they aim to prevent stumbling blocks for marine scientific research, is it difficult to find a balance between regulating science to achieve equity and leaving the high seas open to research. Dr. Robert Blasiak criticised cases where a certain amount of research funding would need to go into hiring national researchers – as opposed to local researchers and collaborations. Including local researchers and collaborations is “planting seeds for the future”, how he puts it.

Open Access to data opens another dimension on equity. While making all information available to everyone constitutes non-monetary benefit sharing, at the same time it opens inequalities among regions in the understanding and use of such material. Simply providing equal access to the material would be part of benefit sharing, however, it would not eliminate existing inequalities regarding the capacity to develop products from MGRs. When data is shared, this data can contribute to each of the BBNJ packages, including the use of MGRs, but also the establishment of Area-Based Management Tools, or support the conduct of Environmental Impact Assessments.

Robert Blasiak mentioned that while it may be unrealistic to think that all countries will have a vibrant biotechnology industry, “having it concentrated in only 2 or 3 countries -- we can do better than that”. Having a broader range of countries benefit would be an important step towards equity.

How to transform Ocean Governance with the BBNJ Agreement

With the opinion piece³, Robert Blasiak and co-authors aimed at initiating the imagination of what could be possible in the transformation of ocean governance. Ideas from the scientific community can go beyond political feasibility and economic interests to point to new ways of seeing and living in harmony with the ocean. He hopes to shift people’s thinking to re-consider the way human govern the ocean today and what could be imagined for the future.

Complexity of different fora to discuss similar issues

Similar discussion are held in different fora, such as the discussion on fair and equitable sharing of benefits from genetic resources in the BBNJ negotiations and the CBD meetings.

Robert Blasiak points to the problem of forum shopping in this regard and when issues are pushed into other fora to avoid discussions. He mentions the issue of intellectual property rights that are pushed between the WIPO and BBNJ meetings and have slowed the process down. Robert Blasiak

³ Claudet, J., Amon, D. J., & Blasiak, R. (2021). Opinion: Transformational opportunities for an equitable ocean commons. *Proceedings of the National Academy of Sciences*, 118(42), e2117033118.

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believes that the constant inflow of new people could be one reason why conversations happen repeatedly and shift to other fora. He also acknowledges that from the outside it might be easy to criticise the slow progress, as consensus among states on these issues take time to negotiate.

How well are existing instruments equipped to address technological advancements..?

Discussions also evolved round the quick advancement of technology and the comparatively slow adoption of international law. International agreements, written several decades ago might not be up-to-speed with the modern technology and possibilities to explore, exploit and protect the ocean.

Genetic resources are defined under the CBD Art. 2¹ “as genetic material of actual or potential value”. Genetic material means “any material of plant, animal, microbial or other origin containing functional units of heredity”. However, there is a lack of knowledge on deep-sea ecosystems. The enshrined definitions might be too narrow for “this environment that is so unique and there is so much we have not discovered yet in the vents”, as one participants put it.

Apart from the potential narrowness of definitions, the example of automated vessels was brought up by an Ocean Seminar participant in the discussions. UNCLOS puts a “human focus”, and also the current BBNJ draft assumes that humans will be the ones collecting MGRs, as opposed to Artificial Intelligence (AI). Autonomous vessels, collecting information without human interventions, need to be considered when adopting new international law on the high seas. Negotiators therefore need to be aware not to draft legal text on the basis of an old idea what technology is.

The Nagoya Protocol was mentioned as an example of international law that has not been able to keep up with advances in biotechnology.⁵ Biotechnology experts that know how to change the code of digital sequence data, for instance, can easily make traceability impossible and still use the sequence data for product development. This points to how quickly and unpredictably technology is moving and the importance of new agreements to find the balance between its legal viability and flexibility to take into account advances in biotechnology.

Where to find the unknown

Genetic compounds can be identical even if found in completely different contexts (in different species or in different geographical locations). This means that a certain gene or digital sequence would be subject to the legal regime where it was first found – which can be ABNJ or national waters.

⁴ The CBD Convention Text can be accessed here: <https://www.cbd.int/convention/text/>

⁵ Wynberg R, Laird SA. Fast Science and Sluggish Policy: The Herculean Task of Regulating Biodiscovery. Trends Biotechnol. 2018 Jan;36(1):1-3. doi: 10.1016/j.tibtech.2017.09.002. Epub 2017 Sep 27. PMID: 28964595. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/28964595/>

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Metagenomic analyses⁶ have shown the immense potential of research and the lack of our knowledge on genomic science. While there is a myriad of genomic data available already, there is no place on the planet that humans have researched completely, where no new genomes could be found.

Transparency standards- scientists making their data transparent

Robert Blasiak welcomes initiatives of scientists to make their data openly accessible. He encourages scientists to add their data to publications to increase transparency and start the social norm of open data sharing. Database managers and journal editors could make the sharing of data a requirement. Once open data sharing is seen as a best practice, he believes it could attract public policy and in this way make it into law.

Recommended further readings by the Ocean Seminar Participants:

Blasiak, R., R. Wynberg, K. Grorud-Colvert, S. Thambisetty, et al. 2020. The Ocean Genome: Conservation and the Fair, Equitable and Sustainable Use of Marine Genetic Resources. Washington, DC: World Resources Institute. Available online at www.oceanpanel.org/blue-papers/ocean-genome-conservation-andfair-equitable-and-sustainable-use-marine-genetic

Duarte CM, Ngugi DK, Alam I, Pearman J, Kamau A, Eguiluz VM, Gojobori T, Acinas SG, Gasol JM, Bajic V, Irigoien X. Sequencing effort dictates gene discovery in marine microbial metagenomes. *Environ Microbiol.* 2020 Nov;22(11):4589-4603. doi: 10.1111/1462-2920.15182. Epub 2020 Sep 29. PMID: 32743860; PMCID: PMC7756799. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32743860/>

Heffernan. Help for the High Seas. *Nature* 557, 154-156 (2018). doi: <https://doi.org/10.1038/d41586-018-05079-z>

Wright, G., Rochette, J., Gjerde, K., Seeger, I. (2018). The long and winding road: negotiating a treaty for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. *IDDRI, Studies N°08/18*, 82 p.

Wynberg R, Laird SA. Fast Science and Sluggish Policy: The Herculean Task of Regulating Biodiscovery. *Trends Biotechnol.* 2018 Jan;36(1):1-3. doi: 10.1016/j.tibtech.2017.09.002. Epub 2017 Sep 27. PMID: 28964595. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/28964595/>

⁶ Duarte CM, Ngugi DK, Alam I, Pearman J, Kamau A, Eguiluz VM, Gojobori T, Acinas SG, Gasol JM, Bajic V, Irigoien X. Sequencing effort dictates gene discovery in marine microbial metagenomes. *Environ Microbiol.* 2020 Nov;22(11):4589-4603. doi: 10.1111/1462-2920.15182. Epub 2020 Sep 29. PMID: 32743860; PMCID: PMC7756799. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32743860/>

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The MARIPOLDATA Team is happy to further contribute to keeping the momentum by bringing together policy-makers, scientists, and civil society from around the world in the monthly Ocean Seminars to discuss relevant ocean issues and present timely research, inviting experts in the field.

We thank Dr. Robert Blasiak for the presentation and discussion on the Conservation and Use of the Ocean Genome.

The MARIPOLDATA Team is looking forward to upcoming Sessions!

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Ina Tessnow- von Wysocki, December 2021