WG170: Physiology and Rates in Microbial Oceanography (PRIMO)

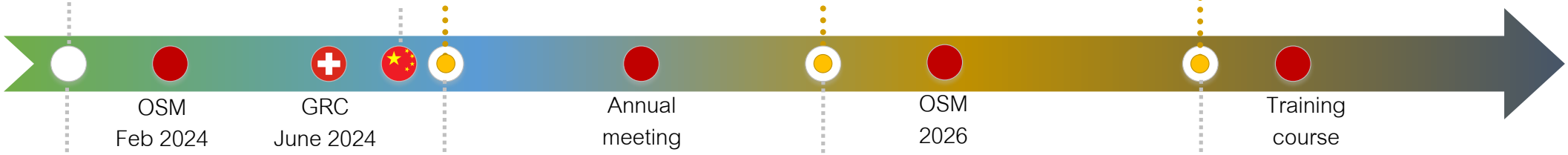
This working group's goals are to:

1) Identify what physiological processes we should be paying attention to. Many physiological approaches were developed before the 'omics revolution. Are we still measuring the best currencies? **Can we leverage the wealth of information from 'omic measurements to measure rates more effectively**?

2) Develop a framework and toolset for discovering proxies of physiological processes that can **bridge 'omics and models**, leveraging expertise from physiologists, 'omics researchers, and modelers.

The overarching aim of the WG is to identify and set the stage for the development of a core suite of measurements that are harmonized, low-cost, easy to use, and high throughput to **promote co-measurement of 'omics, rates, and biogeochemistry.**

PRIMO Timeline



- 1.1: **review the literature** for existing physiological metrics
- 1.2: **identify knowledge gaps** of key metabolic pathways, as revealed by 'omics
- 1.3: **create a ranked list** of the key metabolic pathways to focus on
- **Implement Mentorship program**

Building on ToR 1,

- 2.1: **Identify and rank** the physiological metrics best suited as '**currency converters**' between 'omics and models
- 2.2: collaborate with ocean scale modelers to **identify critical physiological proxies to parameterize**

3: develop a framework and toolset to design and implement the physiological proxies identified in ToR 2 (i.e., learn how to build an assay)

Building on ToR 3,

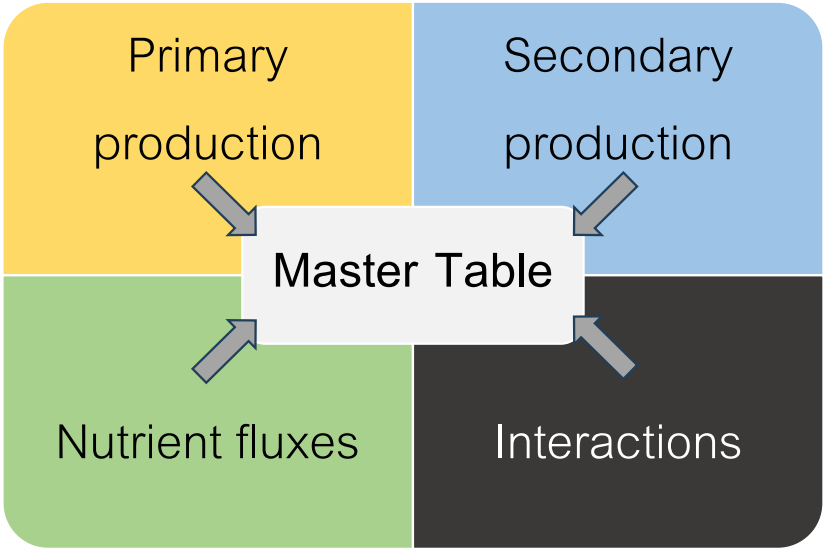
- 4.1: identify a flagship physiological metric to develop, and validate it
- 4.2: explore whether this metric can be made high-throughput, low-cost, and scalable.

ToR 1: mos 1-12 | ToR 2: mos 12-24 | ToR 3: mos 20-36 | ToR 4: mos 30-48

ToR 1 Progress

1. **Review** current physiological metrics
2. **Identify the key knowledge gaps** as revealed by 'omics that are candidates for the co-design of new assays
3. **Rank** assays according to their likely success for development, biogeochemical importance, and modeling ease

Working group split into 4 subthemes



Reviewing

- Currency (e.g., Carbon)
- Resolution (spatial, temporal)
- Assumptions / uncertainties
- What are the gaps?

Ranking

- Importance for biogeochemistry
- Modeling ease
- Suitability for co-measurement (Through-put, cost, scalability)

Future steps

- Publish online database
- **Input from modelers**
- Expertise from other disciplines
- Review paper

Open access to our deliverables

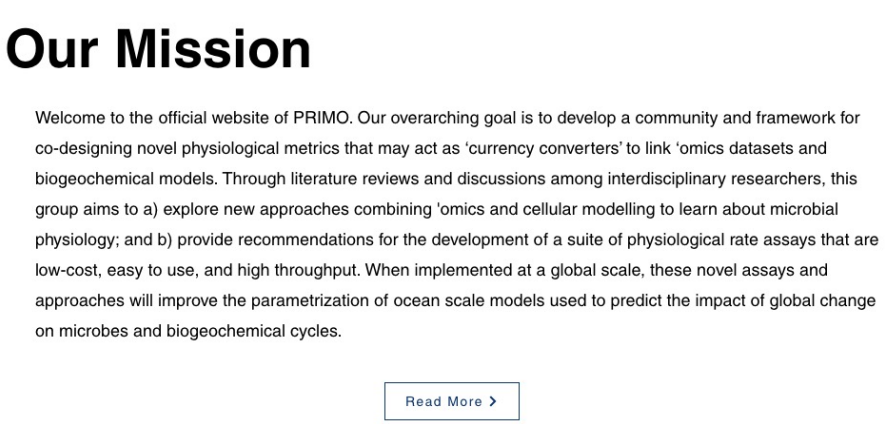
PRIMO website

Launched July 2024

https://www.primoscorwg.org

Future platform for:

- ToR 1 deliverable of an online database of current and desired physiological metrics
- ToR 3/4 deliverable of a web-based marine microbial assay workflow optimization tool



Capacity building

PRIMO Mentorship Program

- Mentees were selected for the program in October 2024.
- Pairs early career researchers with working group members. Mentees will participate in all working group activities.
- We will work with the mentees to access funds, from SCOR and elsewhere, for possible laboratory exchanges and participation in scientific meetings.