JRA1: Genomics Observatories GOs in ASSEMBLE Plus
Association of European Marine Biological Laboratories Expanded

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IMBBC - HCMR

ASSEMBLE Plus Kick off meeting
19-20/10/2017, UPMC, Paris
GOs is a Network

of Ecosystems and/or Sites subject to long-term scientific research, including and not limited to the sustained study of genomic biodiversity from single-celled microbes to multicellular organisms

Davies et al. GigaScience 2014, 3:2

Operation of GOs

- Genomic data are taken together with high quality contextual data (e.g. spatial, temporal, environmental)

- Use and encourage development of standards for all processes: Sampling, Sample processing, Experimentation, Data & Metadata Capture, Data Management, Data Analysis
Some History

Inspirational projects

A. Micro B3 – OSD: Fill the gaps that Tara Oceans, Malaspina and everything else around, could not deliver in terms of workflows, interoperability, software development

B. Tara Oceans: most advanced endeavor: still many gaps in broadly delivering data and infrastructures

C. Genomics Standards Consortium GOs

and now:

D. GOs ASSEMBLE Plus

Sitting on an Infrastructure with secured funding can offer

Temporal dimension &

host international community for global capacity

Suggestion:

Whatever we develop, keep on securing OSD in the background as the simplest maintenance gymnastics
General Principles
Reconcile realism & ambitions

Technology alone does not suffice
This is an exercise for improving collaborative intelligence

Ambition to get to:
- Bring Systems Biology outside the lab into the (Eco)systems
- Get from Genes & Genomes to Phenomes and Ecosystem Functioning
- Produce knowledge from data

The operations we need to support:
- Produce Data with vigilance for methods and their global adoption
- Reduce noise in Big Complex Data, making it Accessible Manageable, Interoperable
- Build good practices and human capacity for the above
Challenges to Big Ambitions

Transparency & Repeatability is where Big Data science fails in human research – extensive literature by I. Ioannidis

Then what about Marine Ecosystems with a thrilling diversity of life, genomes, metabolic processes, habitats & ecosystems, diversity of interactions, flow of energy, matter and information.

Still a single cross generational vehicle DNA!

Will it remain a black box biology for ever?

The above GOs relevant Use Cases keep promise that a different marine biology is almost there

A Single Species vs whole Biomes: Comparative biology may bring more information than noise
The Objectives

1. Initiate a distributed Marine Genomic Observatory (GO) community in European marine biological stations with time-series ecosystem monitoring programs and molecular expertise.

2. Harmonize a consortium strategy and guidelines for DNA barcoding and populate a reference DNA barcoding database for local communities.

3. Produce a common virtual-access portal for GO data and information on protocols, tools and best practices; Communication & Outreach Forum.

4. Perform pilot coordinated sampling and sample processing events via a «GO Ocean Sampling Day» as an end-to-end exercise in order to identify steps in need of improvement and produce a baseline harmonized dataset for virtual access and analysis through the web services provided.
The Actual Committed Partners/Stations

1. The Hebrew University of Jerusalem (HUJI), Red Sea, Israel
2. HCMR, Crete, Greece
3. National Institute of Biology (NIB), Slovenia
4. Stazione Zoologica di Napoli (SZN), Italy
5. UPMC, Villefranche-sur-Mer, France
6. UPMC, OOB, Banyuls, France
7. CCMAR, Faro, Portugal
8. University of Vigo, Spain
9. University of the Basque Country (UPV/EHU), Spain
10. UPMC, Roscoff, France
11. Flanders Marine Institute (VLIZ), Belgium
12. Max Planck Institute for Marine Biology (MPIMM), Germany
13. Institute of Oceanology Polish Academy of Sciences (IOPAN), Poland
14. University of Gdansk (UG), Poland
15. University of Helsinki (UH), Finland
16. of Gothenburg (UGOT), Sweden
17. Marine Biological Association of the United Kingdom (MBA), UK
18. Natural Environment Research Council (NERC-BAS) Antarctic, UK
19. National University of Ireland Galway (NUIG), Ireland
The Tasks

Task JRA1.1. GO standards-literate community building – M12 (HCMR)
Questionnaire & Workshop = > strategy document for GO implementation

Task JRA1.2. GO-Sampling Day M18 (HCMR)
Operation of Pilot cross-consortium: ‘GO-Ocean Sampling day’
Doing the real thing in a well prepared manned, adding new elements

Task JRA1.3. DNA barcoding & metagenomics (UPMC) M24 & M45
DNA barcoding and metabarcoding water column & benthic diversity
Bring all Institutes to level for DNA barcoding and metabarcoding
Populating Reference DNA barcoding data bases

Task JRA1.4. GO virtual-access portal (MPIIMM)
A multipurpose tool communication Forum,
Access to ASSEMBLE Plus and publicly available relevant services,
Outreach tool - window of GOs to the community and the world
## List of Deliverables

<table>
<thead>
<tr>
<th>Deliverable (number)</th>
<th>Deliverable short name</th>
<th>Work package number</th>
<th>Short name of lead participant</th>
<th>Type</th>
<th>Dissemination level</th>
<th>Delivery date (in months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D JRA1.1</td>
<td>Strategy document for establishment of European GO network</td>
<td>JRA1</td>
<td>HCMR</td>
<td>R</td>
<td>PU</td>
<td>M12</td>
</tr>
<tr>
<td>D JRA1.2</td>
<td>Guidelines for standardization of DNA metabarcoding</td>
<td>JRA1</td>
<td>UPMC</td>
<td>R</td>
<td>PU</td>
<td>M18</td>
</tr>
<tr>
<td>D JRA1.3</td>
<td>GO data delivered for VA</td>
<td>JRA1</td>
<td>HCMR</td>
<td>DEC</td>
<td>PU</td>
<td>M24 Update M45</td>
</tr>
<tr>
<td>MS No.</td>
<td>MS name</td>
<td>Related WPs</td>
<td>Due M</td>
<td>Means of verification</td>
<td></td>
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</tbody>
</table>
| 3     | Data Management Plan (DMP) v1       | 1; NA1, 2; JRA1, 3, 4, TA            | 6     | - Publication of D NA2.1, with input from results of WSs of NA2 and JRA1, 3 and 4  
- D NA2.4 online  
- Proposals 1st TA round selected |
| 4     | 2nd GA meeting                      | 1; NA2; JRA1, TA                     | 12    | - Minutes 2nd GA meeting with report of the 1st TA-round, selection of proposals 2nd TA  
- D1.4 and D JRA1.1 delivered |
| 5     | GO Ocean Sampling Day               | 1; JRA1, TA                          | 18    | - 3rd batch of TA proposals selected for TA  
- D JRA1.2 delivered to allow GO sampling day |
| 6     | 3rd GA meeting                      | 1; NA2, 3, 4, JRA1, 2, 3, 5, TA, VA | 24    | - Minutes of 3rd GA meeting; 4th batch of TA proposals selected; Annual TA report  
- D JRA1.3 first data available for VA  
- D NA2.1 v2, D NA3.1, D NA4.1, D JRA2.2, D JRA3.1, D, JRA5.1 delivered |
| 7     | Business Plan                       | 1; NA3, 4; JRA1, 3, TA              | 30    | 5th batch of TA proposals selected for TA  
- D NA3.2, D NA4.2, D JRA1.3, D JRA3.1 delivered |
| 9     | Final JRA deliverables              | NA1, 4; JRA1, 3                      | 45    | - D NA1.2, D NA4.3, D JRA1.3, D JRA3.3 and 3.4 delivered |
Interactions between Activities in ASSEMBLE Plus

3.1.4. Graphical presentation of the components and their inter-relation

- ASSEMBLE Plus Web Portal
- ON-SITE/REMOTE
  - Ecosystems
  - Facilities
  - Expertise
  - Organisms
- REMOTE
  - Data Protocols
  - Historical Observations
- VIRTUAL ACCESS
- TRANSNATIONAL ACCESS
- JRA1: Genomics Observatories
- JRA2: Cryopreservation
- JRA3: Functional Genomics
- JRA4: Instrumentation
- JRA5: Scientific Diving
- JRAs

- NA1: Improving access provision
- NA2: Improving virtual access
- NA3: KT - Engaging with user communities
- NA4: Long-term sustainability

- USER COMMUNITIES
- AB
- USP
- Management & Communication
- GA, PIC
- European Commission

Figure 4: PERT Chart of Assemble Plus activities and their interrelationship.
## Travel budget - UPMC management

### Giving flexibility to workshops

<table>
<thead>
<tr>
<th>UPMC management of Travel needs</th>
<th>Cost (€)</th>
<th>Event - Meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6,000</td>
<td>Costs related to participation on regular meetings in the frame of Networking (NA3, NA4), Joint Research Activities (JRA1) and management meetings.</td>
</tr>
<tr>
<td></td>
<td>15,400</td>
<td>Attendance to meetings organised under NA2, NA3, NA4, JRA1 and JRA5.</td>
</tr>
<tr>
<td></td>
<td>6,000</td>
<td>Budget requested to attend coordination and workshop meetings in WP NA2, NA3, NA4, JRA1, JRA3</td>
</tr>
<tr>
<td></td>
<td>10,500</td>
<td>Travel costs for meetings related to Networking (NA2, NA4), Joint Research Activities (JRA1, JRA4) and project review meetings.</td>
</tr>
<tr>
<td></td>
<td>36,500</td>
<td>Travel costs for meetings related to NA1, 3, 4 and JRA1, 3,4 + project review meetings</td>
</tr>
<tr>
<td></td>
<td>18,400</td>
<td>Travel of CCMAR staff to annual meetings and workshops; and travel of invited participants external to the consortium to 2 conferences, and training in NA3, JRA1 and JRA4.</td>
</tr>
<tr>
<td></td>
<td>10,500</td>
<td>Costs for travel required for attendance at programmed project meetings under NA 2 and 4 and JRA1 and 2.</td>
</tr>
<tr>
<td><strong>Total for Travel</strong></td>
<td><strong>103,300</strong></td>
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</table>
### “Other costs” – UPMC management

**Giving flexibility to operations**

<table>
<thead>
<tr>
<th>UPMC Goods and services</th>
<th>Cost (€)</th>
<th>Other goods and Services - Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost €</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td></td>
<td>Costs for dedicated consumables related to JRA1 activity.</td>
</tr>
<tr>
<td>5500</td>
<td></td>
<td>Materials and supplies necessary in the frame of NA2, JRA1 and JRA5 activities.</td>
</tr>
<tr>
<td>62422</td>
<td></td>
<td>Consumables to support genomic and equipment actions in JRA1 and JRA4 (12000) + TA actual costs (50422)</td>
</tr>
<tr>
<td>53089</td>
<td></td>
<td>lab consumables mainly for JRA1+JRA5 (14000)+ TA actual costs (37089) + subsidence (2000)</td>
</tr>
<tr>
<td>198000</td>
<td></td>
<td>Consumables needed for JRA1, 3 and 4 (93000) + audit costs (25000) + NA1 workshop organisation (80000)</td>
</tr>
<tr>
<td>173961</td>
<td></td>
<td>Expenses related to organization of conferences, training and workshops in NA3, and consumables in JRA1, JRA2 and JRA4 (66000) + TA actual costs (107961).</td>
</tr>
<tr>
<td>5000</td>
<td></td>
<td>Minor consumables to cover JRA1 expenses and transfer of samples between partners for analysis.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>500,972</strong></td>
<td></td>
</tr>
</tbody>
</table>
19 marine stations: 16 along Europe and one for each of Red Sea, Antarctic and Arctic ocean

- **Metagenomics**: bacteria - viruses
- **Metatranscriptomics**: bacteria - eukaryotes
- **Metabarcoding**: prokaryotes - eukaryotes

Also Supported by EMBRC, LIFEWATCH, ELIXIR
Map of OSD Participant sites
Thank you for your attention!

40 months employed person on JRA1
Taxonomy experts
Biodiversity Informatics
Bioinformatics
Experimental Meta-barcoding
Metagenomics
Computer cluster (640 cpus)
Close Interaction with NA2 TA