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# WG4 progress report & future plans

8 July 2021

Dissemination, Communication & Training

COST Action CA18131 - Virtual WGs Meeting, 7-8 July 2021

**WG4 Leader:** **Domenica D'Elia**

**Vice WG-L:** **Aldert Zomer**

**SCM:** **Dimitrios Vlachakis**





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## SCM & WG4 Commitments

### Scientific Communication Manager:

- Take actively part in online Core Group meetings
- Be in close contact with the WG4 leaders and activities **to support dissemination**
- **Take care of document organization (Google Drive)**
- **Support photo documentation at events and note-taking when possible or delegate it**
- Support the **building and maintenance of the website**
- **Lead the management of the social media for the Action**

### WG4

- **Maintaining website**
- **Organize online meetings**
- **Start YouTube channel**
- **Liaise with the SCM for dissemination and outreach activities**
- **Help organizing Teaching Schools**





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## WG4 Objectives

### Disseminate the results of the COST Action in

- peer-reviewed journals
- on the web-portal
- at international conferences (*good as for now*)
- on social networks (LinkedIn and Twitter are OK – we need to solve problems for Facebook and others)
- through end-user workshops & training schools in microbiome-related ML methodologies recommended by Action members

### Tasks

T4.1: Disseminate evaluation, optimisation and standardisation progress.

T4.2: Organise training courses (e.g. Summer Schools) and workshops.





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## WG4 Objectives: Activities, Milestones, Major Deliverables & Training

### Activities:

**A4.1:** A dissemination strategy will be developed whereby regular the COST progress and outcomes will be shared within and outside the Action at the Web-portal, international conferences, COST reports, white-papers and peer-reviewed publications.

**A4.2:** The WG4 members will assess the need for ML/Stats training among the COST members and subsequently design, organise and implement regular training courses and workshops.

### Milestones:

**M4.1:** Initial workshop (Y1Q4), training courses (Y2Q3/Y3Q3) and YouTube tutorials (Y4Q3)

### Major Deliverables:

**D4.1-3:** Reports on the workshops & training courses of best practice in ML/Stats for microbiome studies.

**D4.4:** Educational material shared: tutorials on paper and video (including a YouTube channel).





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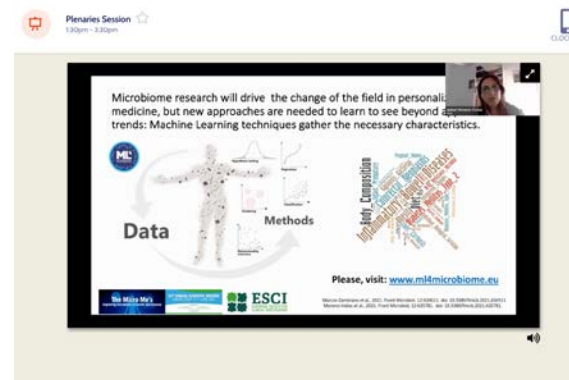


## Presentation at 6 International Conferences (2020-2021)

1. EOSF 2020 – Euroscience Open Forum, Trieste (IT), Sept. 2020 (Marcus)
2. GOBLET AGM 2020 – Sept. 2020 (Virtual) (Domenica) – **talk presentation on GOBLET YouTube Playlist**
3. EMBnet AGM 2020 – Sept. 2020 (Virtual) (Tatjana) – **talk presentation on EMBnet YouTube Playlist and Abstract published in the EMBnet Journal (Conference Proceedings, vol. 26)**



4. **European Congress on Obesity, ECO2021**



5. **European Society for Clinical Investigation, ESCI2021**

Isabel Moreno





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Isabel Moreno

**Inviter speaker at SEEDO2021**

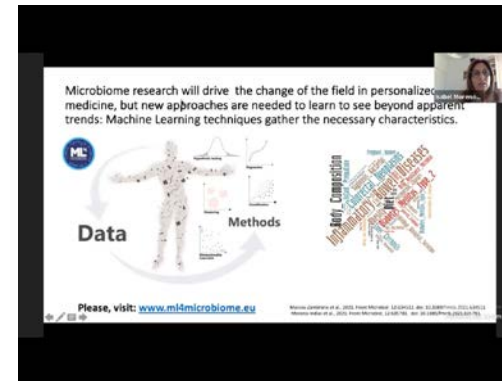
*Spanish Society for the study of obesity*

**New Approaches In Microbiome Studies Machine Learning Y Microbiota**

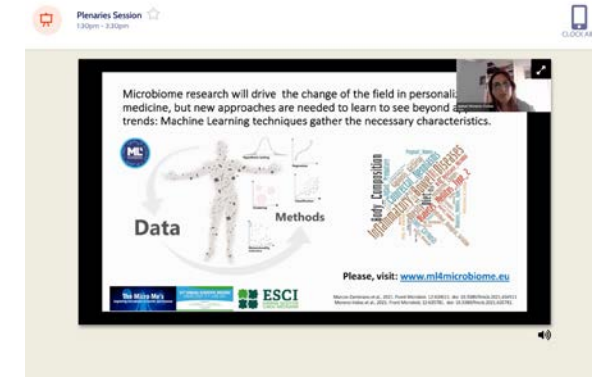
**PROPOSAL:**

Isabel is going to write a review about the use of machine learning in microbiome data for its use in precision medicine in obesity to prepare this talk.

Isabel invite anyone who wants to help her write the manuscript as a ML4Microbiome deliverable



**European Congress on Obesity, ECO2021**



**European Society for Clinical Investigation, ESCI2021**





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**6. International Human Microbiome Consortium Congress 2021** - Virtual Congress — June 27, 28 & 29  
(<https://ihmc2021.com/>) – Poster presentation (Marcus)

**7. EMBnet & GOBLET AGM 2021 – 11-15 October 2021 (Upcoming)**

ML4Microbiome dissemination events planned:

1. ML4Microbiome Symposium on Grand Challenges of Data-Intensive Science in microbiome & metagenome data analysis and training (**all member are invited to attend and to present their work**)
2. organisation of a mini workshop on " Statistical and machine learning techniques for microbiome data analysis"  
(VM grant to Eliana Ibraimi) – **all members are invited to present candidacy as lecturer & trainer**





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ML4Microbiome Symposium  
**Grand Challenges of Data-Intensive Science in microbiome & metagenome data  
analysis and training**  
14 October 2021

**Expected outcomes:**

- Recorded presentation in YouTube Playlist;
- Presentations in the Action's web site;
- Report to be published in the EMBnet Journal;
- Establish new contacts and collaborations (networking with other organisations & community building)





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ML4Microbiome workshop on  
**Statistical and machine learning techniques for microbiome data analysis**  
15 October 2021

**Expected outcomes:**

- Recorded presentations in YouTube Playlist;
- Slide Presentations in the Action's web site;
- Training material in the Action's web site;
- Reports to be published in the EMBnet Journal;
- Establishment of new contacts and collaborations (community Building)



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## Publications: 3 in total reported in the Progress Report n. 2

**Manuscript title:** Statistical and machine learning techniques in human microbiome studies: contemporary challenges and solutions

**Journal:** *Frontiers in Microbiology*, section Evolutionary and Genomic Microbiology

**Article type:** Perspective

**Manuscript title:** Applications of Machine Learning in Human Microbiome Studies: A Review on Feature Selection, Biomarker Identification, Disease Prediction and Treatment

**Journal:** *Frontiers in Microbiology*, section Evolutionary and Genomic Microbiology

**Article type:** Review

**Manuscript title:** Literature on Applied Machine Learning in Metagenomic Classification: A Scoping Review

**Journal:** *Biology*

**Article type:** Review





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Aldert Zomer



**Training School – postponed to Sept. 2021 (date to be agreed hopefully today)**

[ML4Microbiome Training School \(Sweden Virtual 2021\) - Google Sheets](#)

**Trainers to be assigned for the following topics**

Statistical analysis of microbiome data - Eliana?

An introduction to compositional data analysis

Machine learning: basic concepts

Unsupervised learning: From basic to ensemble approaches - Part 1-2; Hands on sessions

Discussion on rarefying, clustering and data transformation (alr/clr/ilr)

Supervised machine learning: general description; Model quality assessment (accuracy, specificity, sensitivity);

Approaches to build test/training sets – Hands on session

Structured output prediction: Time Series; Link prediction & Network reconstruction; Exploitation of causal relationships for network reconstruction; Multi-type and multi-target prediction - Hands on sessions

**WG4 Proposal: to assign a VM Grant to assist in the organisation and production of dissemination material and for paying external trainers if needed – decision to be taken and budget to be assigned today**



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## Dissemination & Communication plan 2021-2022 to be implemented

- **More article publications** – any article where at least two members are involved can be published with acknowledgements to ML4Microbiome and communication has to be done to WG4
- Production of reports and their publication in journals or web repository that provide a DOI
- **Web site & Social Media:**
  - **News:** communicate to WG4 any type of news that can be of interest for members or their followers
  - **Research Section:** currently empty - Research updates - we need abstracts of the WG1/2/3 updates and then upload their abstracts at this section of the website (Champion: Aldert)
  - **STSMs Section:** currently empty - Should include the text from the final report and a short bio statement of tgrantees. **WG4 proposal:** video interviews or text comments from grantees about benefits they got from their experience (social & professional). **If we hire a person with a VM grant that can dedicate time to this task we could to create interview schemas and make recorded interviews to be published on the YouTube Channel**



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## **Dissemination & Communication plan 2021-2022 to be implemented**

- **Dissemination activities at international conferences to be held 2021-2022; (we need a list to plan these activities for the WBP 2021-2022)**
- **Communication & Dissemination activity at national level (member countries) & organisation of training activities based on specific need (survey to be done)**
- **Production of teaching material or video tutorials;**
- **Community Building**



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## **Community Building: Communication and interaction with different interest groups (incl. wider public)**

The main aim of our action is

**Create productive symbiosis between discovery-oriented microbiome researchers and data-driven Machine Learning experts, and optimise and then standardise the use of said techniques, following the creation of publicly available benchmark datasets**

To prompt this productive symbiosis, we need to keep in contact and interact with ML & discovery-oriented microbiome researchers communities. To this aim we need:

- 1.a Check other COST Actions and organise a cross-COST Action meeting
- 1.b Check for European Projects/Initiatives in the field that can have interest for our Action
- 1.c Organise a meeting with representatives from diverse projects and initiatives (Stakeholder meeting)



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## Some examples:

- International Human Microbiome Coordination and Support Action (IHMCSA)
- International Human Microbiome Consortium
- Machine Learning Focus Group | ELIXIR ([elixir-europe.org](http://elixir-europe.org))
- ELIXIR Marine Metagenomics Community [While the ELIXIR Marine Metagenomics Community focuses on serving the marine research community, its results can have direct application in related fields and can lead to new scientific discoveries. Read more: [Almost 2000 unknown bacteria discovered in the human gut \(EMBL-EBI press release\)](#).(ELIXIR-EXCELERATE helps to uncover human microbiome | [ELIXIR \(elixir-europe.org\)](http://elixir-europe.org))
- ...please, suggest others

## Stakeholder analysis

- we need to do a complete stakeholder analysis with reflection on why are these groups essential for us to, what do we want from them, and also need to specify what we can provide to them (we need to have incentives that these groups cooperate with us in ml4microbiome)
- as a result of the stakeholder analysis, we can decide which measures and activities would be the best to connect with the respective stakeholder groups

Stakeholder	What do we need from them?	What can we offer?	How?
Other COST Actions	<ul style="list-style-type: none"> <li>- Advocates</li> <li>- Awareness, connection,</li> <li>- Identification of needs, gaps</li> </ul>	<ul style="list-style-type: none"> <li>- Information</li> <li>- Support</li> <li>- Visibility</li> <li>- Synergy</li> </ul>	Providing information as <ul style="list-style-type: none"> <li>- Flyer</li> <li>- Presentation</li> <li>- Training material</li> <li>- Advice</li> <li>- Survey</li> <li>- <b>Joint meetings</b></li> </ul>
H2020 projects or initiatives correlated with microbiomes or ML Initiatives	<ul style="list-style-type: none"> <li>- information about their activities, resources etc.</li> <li>- gap analysis, needs identification</li> <li>- Collaboration</li> <li>- Integration of activities</li> <li>- generation of <u>joint framework</u></li> <li>- <b>Communication</b></li> </ul>	<ul style="list-style-type: none"> <li>- Information</li> <li>- Support</li> <li>- Visibility</li> <li>- Synergy</li> <li>- joint advocacy towards funders</li> <li>- joint activities of <b>communication and dissemination</b> for communities</li> </ul>	<ul style="list-style-type: none"> <li>- participation/ presentation in meetings</li> <li>- <b>improvement of communication through our Twitter and LinkedIn accounts</b></li> <li>- Joint publications</li> <li>- Training material or activities</li> <li>- Advice</li> <li>- Survey</li> </ul>

**Proposal for to start and conclude this work in a reasonable time (October 2021)**

- To make a call for a Virtual Mobility grant

**Expected results:**

- A list of Communities as potential partners/ collaborators
- A list of representative to be contacted
- A report

**Follow-up**

- The organisation of a meeting with representative of communities selected (discovery-oriented microbiome researchers and ML scientists) in April-May 2022

**Expected results:**

- Publication of a report
- Synergic collaborations
- Publication of scientific papers or review on topics and challenges of common interest
- STMS new opportunities





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## SUMMARY

### **Community Building**

- Analysis of stakeholders (science, industry, standardisation bodies, policymakers,.. ) for the organisation of joint meetings to be implemented in the upcoming last 2 year – 2022 other COST Actions and Scientific Communities **(VM grant possible)**

### **Increase communication activities among our community and outside**

- ML4Microbiome Newsletter: <https://www.ml4microbiome.eu/newsletter-sign-up/> (what and how)**(VM grant possible)**
- Web site & Social Media more active - more content (research, STSM, training material, interview) **(VM grant possible)**
- Organisation of meeting with other communities (discovery-oriented microbiome researchers and ML scientists)

### **Plan Dissemination**

- Presentations in conferences (2021/2022)
- Publications

### **Training**

- Support the organisation of the training school **(VM grant possible)**
- National level dissemination & Communication - **organisation of workshop or hands-on on different and specific topics?**
- Implementation strategy (together with other WGs)



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## Critical Points



**Poor communication among ML4Microbiome members (SLACK to be use daily or at least weekly)**

**Lack of collaboration (meeting to be held at least every 2 monts)**



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Dissemination & Communication but also research plan implementation can be supported by new COST Tools

## **Virtual Networking Support Tools (Grants)**

- **Virtual Networking Support (VNS) Manager**
- **Virtual Mobility (VM)**



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A call has already be made in June: 2 applications received

A new call can be still done

Action Chair responsible for evaluation

Grant Holder responsible for notifications and payment

Report to be produced by October 15th (last deadline)