

**Deliverable 2.3**

<b>Project ID</b>	654241
<b>Project Title</b>	A comprehensive and standardised e-infrastructure for analysing medical metabolic phenotype data
<b>Project Acronym</b>	PhenoMeNal
<b>Start Date of the Project</b>	1st September 2015
<b>Duration of the Project</b>	36 Months
<b>Work Package Number</b>	2
<b>Work Package Title</b>	Sustainability of PhenoMeNal
<b>Deliverable Title</b>	D2.3 Updated Report on mapping of e-infrastructures, users, investments for supporting policy developments in the field of metabolomics, biomarkers and biobanks
<b>Delivery Date</b>	M22
<b>Work Package leader</b>	UL
<b>Contributing Partners</b>	All consortium
<b>Authors</b>	Merlijn van Rijswijk, Namrata Kale, Christoph Steinbeck, Philippe Rocca-Sera, Tim Ebbels, Bobby Glen, Mark Viant, Ralf Weber, Daniel Schober, Steffen Neumann, Ola Spjuth, Fabien Jourdain, Etienne Thevenot, Marta Cascante, Pedro de Auturi, Antonio Rosato, Luca Pireddu, Maria Klapa (Greece), Michael Holcapek (Czech Republic), Ana Gil (Portugal), Kairi Tammoja (Estonia)
<b>Abstract</b>	This document “D2.3 Updated Report on mapping of e-infrastructures, users, investments for supporting policy



developments in the field of metabolomics, biomarkers and biobanks” is an update and extension of the D2.1 report, where we concentrated on mapping of the relevant (e-)infrastructures. In this document, we give:

- Overview of potential users of the PhenoMeNal
- Potential “champions/ambassadors”, biological and medical researchers influential in their field, who can enable us to reach out to a broader community for accepting and implementing PhenoMeNal.
- Overview of potential contributors (instrument vendors, pharma companies, open source software companies)
- Overview of the (national) policy measures which can help sustaining the PhenoMeNal infrastructure and how PhenoMeNal has positioned itself in these.
- Update on newly formed (e-)infrastructures
- Overview of the interactions with the (e-)infrastructures identified in the D2.1 report
- New country reports on Greece, Estonia, Czech Republic and Portugal, identifying potential users in these countries and relevant e-infrastructures

Based on the mapping we present an action plan for the strategic and systematic outreach activities in the period M24-M36, as a logic consequence of the mapping activities.



## Table of Contents:

1	INTRODUCTION AND SCOPE OF THIS REPORT .....	4
2	ACTION PLAN FOR THE SYSTEMATIC AND STRATEGIC OUTREACH ACTIVITIES IN M24-M36 .....	4
2.1	Phase 1 (August 2017 - August 2018).....	5
2.2	Phase 2 (January 2018 - August 2018): .....	5
2.3	Phase 3 (May 2018 - August 2018): .....	6
3	UPDATE OF THE COUNTRY REPORTS INCLUDING UPDATES ON MAPPINGS .....	6



## 1 INTRODUCTION AND SCOPE OF THIS REPORT

In this document “D2.3 Updated Report on mapping of e-infrastructures, users, investments for supporting policy developments in the field of metabolomics, biomarkers and biobanks” we build on the D2.1 report, in which we focused on the mapping of (e-)infrastructures. This report is an expansion with regards to:

- An action plan for the strategic and systematic outreach activities in the period M24-M36, as a logic consequence of the mapping activities
- An update of the country reports, including now
  - Mapping of “champions/ambassadors”, influential users in their field, who can help in convincing others of using the PhenoMeNal infrastructure
  - Mapping of (potential) users of the PhenoMeNal infrastructure
  - Mapping of potential contributors (instrument vendors, pharma companies, open source software companies)
  - Overview of the interactions with the (e-)infrastructures identified in the M6 D2.1 report
  - Update on recently formed (e-)infrastructures
  - Mapping of relevant (national) investment programs for Research Infrastructures, and how PhenoMeNal could benefit from these
- An extension of the mapping with country reports on Greece, Estonia, the Czech Republic and Portugal

We start with the action plan, as this is the overarching document dealing with “what are going to do” with all this knowledge generated in the mapping exercise.

## 2 ACTION PLAN FOR THE SYSTEMATIC AND STRATEGIC OUTREACH ACTIVITIES IN M24-M36

One of the major challenges the PhenoMeNal faces in the next year, is to grow an active community of users, as well as to ensure the “stickyness” of new users.

Outreach activities are divided across three different phases, and cover the following objectives:

- to familiarise potential users and contributors across the metabolomics, biomedical and clinical communities, mainly in Europe, with the PhenoMeNal e-infrastructure;
- to increase the use of PhenoMeNal across users and integrate the e-infrastructure in their day-to-day data-processing and analysis workflow environment;



- to develop and provide face-to-face (and online) training and support;
- to create a network of customers, trainers, champions and ambassadors, and contributors to help guarantee long-term support and sustainability of PhenoMeNal.

## **2.1 Phase 1 (August 2017 - August 2018)**

Introduce and demonstrate PhenoMeNal e-infrastructure to potential users and contributors (listed in Table 1 and the country reports) as well as raise awareness across the community (i.e. potential new users and contributors not listed in Table 1 and the country reports). Activities shown below provide a *first opportunity* for online or face-to-face interaction with our “customers”. All potential “customers” will be informed and invited for the above via the contact person listed in Table 1.

- Up to three webinars will be presented to introduce and demonstrate PhenoMeNal. A recording of the webinar will be made available online to increase coverage.
- A number of face-to-face workshops to introduce and demonstrate the PhenoMeNal e-infrastructure. Standardised training material will be developed and distributed across trainers/demonstrators to assure a high standard and consistency across demonstrations/training.
  - Cloud-based Metabolomics Data Analysis and Collaboration, September 2017, Sardinia, Italy
  - Metabolomics workflows, October 2017, Cambridge. EMBL-EBI, UK
  - One day MetaboMeeting hands-on workshop, December 2017, Birmingham, UK
  - EMBL-EBI & UoB organised training workshop, Spring 2018, EMBL-EBI, Cambridge, UK
  - International Metabolomics society conference, June 2018, Seattle, Washington, US
- Advertise Phenomenal across a number of channels (e.g. MetaboNews, Phenomenal website, newsletter, blog, personal interactions and meetings).

## **2.2 Phase 2 (January 2018 - August 2018):**

Introduce and demonstrate PhenoMeNal to potential users, champions and ambassadors, and contributors that have shown an interest (Table 1 and the country reports). All potential “customers” will be contacted via the contact person listed to plan face-to-face (or online) training session.



- A dedicated trainer or demonstrator will visit the "customer's" site to provide a 1/2 day of face-to-face (or online) training to (further) introduce and demonstrate phenomenal.
- Training material will be developed and distributed to assure a high standard and consistency across training/demonstrations.
- All participants of the training will be asked for feedback, which will be used to shape training in phase three and further improve the functionalities within the phenomenal infrastructure.

### 2.3 Phase 3 (May 2018 - August 2018):

Customers that who show further interest will be contacted again via the contact person listed in Table 1 and the country reports to plan face-to-face (or online) a more extensive training session.

- *1-day follow-up training* will be provided at the "customer's" site to let the customer process and analyse their own datasets *using Phenomenal*.
- Standardised training material will be developed and distributed (as part of phase 1 and 2) across trainers/demonstrators to assure a high standard and consistency across demonstrations/training.
- A number of these customers potentially become "Champions or Ambassadors" for Phenomenal. Experiences will be reported for further improvement, long-term support and sustainability of Phenomenal and also shared via a online blog.

## 3 UPDATE OF THE COUNTRY REPORTS INCLUDING UPDATES ON MAPPINGS

A summary of the outcomes of the mapping, providing an overview of major potential users, champions and ambassadors, and contributors are listed in **Table 1**. More information is listed in the separate country reports.

**Table 1. Summary of the champions and most important potential users of the PhenoMeNal infrastructures, based on the findings from the country reports**

Who do we target	What do we want to achieve	Who takes action	What are we going to do?
<b>Potential champions / ambassadors</b>			
<b>Albert Koulman</b>	Application of	Ralf Weber,	Organize a



NIHR BRC Clinical Metabolomics and Lipidomics Laboratory <sup>1</sup> , Cambridge (UK)	PhenoMeNal in Clinical / Biomedical Metabolomics and Lipidomics	James Bradbury, Philippe Rocca-Serra	meeting (online/offline) and demonstrate PhenoMeNal
<b>Hans Clevers</b> Hubrecht Institute <sup>2</sup> , Utrecht (NL)	Application of PhenoMeNal in organoid cancer research	Thomas Hankemeier	Organize a meeting with the Clevers team, potentially involving Proteomics and Genomics researchers too
<b>Cisca Wymenga<sup>3</sup></b> <b>/ Cornelia van Duijn<sup>4</sup></b> / <b>Eline Slagboom</b>	Application of PhenoMeNal in BBMRI-NL Biobank research of Life Lines Deep cohort and Rotterdam Study	Thomas Hankemeier	Organize a meeting with the BBMRI-NL team, potentially involving Px and Gx researchers too
<b>Thomas Moritz</b> , Swedish Metabolomics Centre and Science for Life Laboratory	SMC should present PhenoMeNal as a way for their clients to analyze data SMC produces	Ola Spjuth	Present and demonstrate PhenoMeNal
<b>Prof. Hannelore Daniel</b> TU Munich	For her to act as multiplier amongst clinical academics in Germany	Christoph Steinbeck	Present and demonstrate PhenoMeNal
<b>Christophe Junot</b> (CEA)	Application of PhenoMeNal in Clinical/Biomedical Metabolomics	Etienne Thévenot	Organize a meeting (online/offline) and demonstrate

<sup>1</sup> <https://cambridgebrc.nihr.ac.uk>

<sup>2</sup> <http://hub4organoids.eu/about-us/team/hans-clevers/>

<sup>3</sup> <http://www.rug.nl/research/genetics/staff/cisca-wijmenga>

<sup>4</sup> <https://www.erasmusmc.nl/epid/51026/2581336/duijn-coch-van?lang=en/>



			PhenoMeNal
<b>Potential users (academic and industrial)</b>			
<b>Prof. Jim Davies, CTO</b> (jim.davies@cs.ox.ac.uk) <b>Genomics England</b>	Application of PhenoMeNal in Clinical /	Philippe Rocca-Serra Ralf Weber, James Bradbury	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>Victoria Vazquez</b> Genetics & Molecular Medicine Twin Research & Genetic Epidemiology <sup>5</sup> victoria.vazquez@kcl.ac.uk	Application of PhenoMeNal in Clinical / Biomedical Metabolomics to Twin studies	Philippe Rocca-Serra Ralf Weber, James Bradbury	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>Rob Vreeken</b> / Janssen Pharmaceuticals <sup>6</sup>	Application of PhenoMeNal in pharma company	Thomas Hankemeier / Merlijn van Rijswijk / Amy Harms / Michael van Vliet	Organize a meeting at Janssen Pharmaceuticals in Beerse, demonstrating PhenoMeNal
<b>Alain van Gool</b> / Radboudumc Nijmegen <sup>7</sup>	Application of PhenoMeNal in a University Medical Centre	Thomas Hankemeier / Merlijn van Rijswijk / Amy Harms / Michael van Vliet	Organize a meeting at Radboudumc, demonstrating PhenoMeNal
<b>Dr. Martin Boeker</b> , Freiburg University Clinic <sup>8</sup> (UKLFR)	Check if UKLFR has suitable data pipelines that could be run in Phenomenal.	Daniel Schober	Ask if Martin Boeker (and Stefan Schulz) know someone at Freiburg University Clinic (or Graz) that would be

<sup>5</sup> <http://www.twinsuk.ac.uk/>

<sup>6</sup> <http://www.janssen.com/us/>

<sup>7</sup> <https://www.radboudumc.nl/patientenzorg>

<sup>8</sup> <https://www.uni-freiburg.de/universitaet-en/uniklinik>





			interested in testing PhenoMeNal
<b>Nicolas Schauer</b> Metabolomics Discoveries <sup>9</sup>	Adoption of PhenoMeNal pipeline in industry	Steffen Neumann	Reach out to existing contact CEO Nicolas Schauer
University of Verona <sup>10</sup> - Metabolomics lab	Foster adoption	Antonio Rosato	PhenoMeNal demo
Laboratorio di Risonanza Magnetica "Annalaura Segre" <sup>11</sup>	Foster adoption	Leonardo Tenori	PhenoMeNal demo
<b>Craig Wheelock</b> / Karolinska Institutet <sup>12</sup> , Sweden	Foster adoption	Kim Kultima	PhenoMeNal demo
<b>Daniel Globish</b> / Uppsala University <sup>13</sup> , Sweden	Application of PhenoMeNal in their Metabolomic analysis	Kim Kultima	PhenoMeNal demo
<b>Jesus Vázquez / Fátima Cabo</b> / Centro Nacional de Investigaciones Cardiovasculares Carlos III (CNIC) <sup>14</sup>	Application of PhenoMeNal in their Metabolomic analysis	Pedro de Atauri/ Marta Cascante	We plan to contact and if they agree we will organize a meeting
<b>Aurélien Thomas</b> (University of Lausanne, CH) <sup>15</sup>	Application of PhenoMeNal in academia	Sven Bergmann	Organize a meeting at University of Lausanne, demonstrating PhenoMeNal

<sup>9</sup> <http://www.metabolomicdiscoveries.com>

<sup>10</sup> <http://www.univr.it/jsp/index.jsp>

<sup>11</sup> <http://nmr.imc.cnr.it>

<sup>12</sup> <http://ki.se/en/startpage>

<sup>13</sup> <https://www.uu.se/en/>

<sup>14</sup> <https://www.cnic.es/en>

<sup>15</sup> <https://www.unil.ch/central/en/home.html>



<b>Stanislas Grassin Delye</b> (Paris Saclay University, Foch Hospital) <sup>16</sup>	Application of PhenoMeNal in Clinical/Biomedical Metabolomics	Etienne Thévenot	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>MedDay Pharmaceutical</b> Mass spec facility - Dr Sandrine Aros, France) <sup>17</sup>	Foster adoption, already aware of initiative	Fabien Jourdan	Ask them to deploy and test
<b>Emmanuel Mikros</b> , Department of Pharmaceutics, University of Athens <sup>18</sup>  <b>Leandros Skaltsounis</b> (coordinator of the same laboratory)	Standardized repositories, Streamlining NMR-based metabolomics research and applications  Major laboratory in Greece and Europe for natural products research – collaboration with relevant companies	Pablo Moreno, Michael van Vliet, Ralf Weber, James Bradbury	Connect needs to tools, direct to proper training, understanding needs for tool improvement
<b>Maria Klapa</b> , FORTH/ICE-HT <sup>19</sup>	Standardized repositories, Streamlining MS-based metabolomics research and applications	Pablo Moreno, Michael van Vliet, Ralf Weber, James Bradbury	Ask them to deploy and test
<b>Peter Simek</b> Biology Centre CAS Czech Republic <sup>20</sup>	Foster adoption	Pablo Moreno, Michael van Vliet, Ralf Weber,	Ask them to deploy and test

<sup>16</sup> <https://www.universite-paris-saclay.fr/en>

<sup>17</sup> <http://www.medday-pharma.com>

<sup>18</sup> <http://en.pharm.uoa.gr/the-department.html>

<sup>19</sup> <http://www.iceht.forth.gr>



		James Bradbury	
<b>David Friedecky</b> Laboratory of Metabolomics at Palacky University in Olomouc Czech Republic <sup>21</sup>	Foster adoption	Pablo Moreno, Michael van Vliet, Ralf Weber, James Bradbury	Ask them to deploy and test
<b>Ana Gil</b> University of Aveiro <sup>22</sup> , Portugal	Foster adoption, already aware of initiative	Pablo Moreno, Michael van Vliet, Ralf Weber, James Bradbury	Ask them to deploy and test
<b>Carla Cruz</b> University of Beira Interior <sup>23</sup> , Covilha Portugal	Foster adoption	Pablo Moreno, Michael van Vliet, Ralf Weber, James Bradbury	Ask them to deploy and test
<b>Ruth Shimmo</b> University of Tallin <sup>24</sup> , Estonia	Foster adoption, already aware of initiative	Pablo Moreno, Michael van Vliet, Ralf Weber, James Bradbury	Ask them to deploy and test
<b>Potential contributors (instrument vendors / other organisations)</b>			
<b>Prof Yike Guo</b> Data Science Institute <sup>25</sup> , Imperial College London		Philippe Rocca- Serra, Ralf Weber, James Bradbury	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>Kees van Bochove</b> The Hyve <sup>26</sup>	Support of the development of PhenoMeNal by a open source software	Michael van Vliet	Give a demonstration of the PhenoMeNal infrastructure to the software

<sup>20</sup> <http://www.bc.cas.cz/en/>

<sup>21</sup> <http://www.upol.cz/en/>

<sup>22</sup> <https://www.ua.pt>

<sup>23</sup> <http://www.ubi.pt/en/>

<sup>24</sup> <https://www.tlu.ee/en>

<sup>25</sup> <https://www.imperial.ac.uk/data-science/>

<sup>26</sup> <http://thehyve.nl>

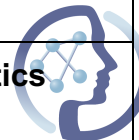


	developing company after the end of the project		developers of the Hyve
<b>Bayer Pharma AG</b> <sup>27</sup> 13342 Berlin	Adoption of PhenoMeNal pipeline in industry	Christoph Steinbeck	Reach out to existing contacts Bertram Weiss and Mark Ott
<b>Metanomics Health</b> <sup>28</sup>	Adoption of PhenoMeNal pipeline in industry	Christoph Steinbeck	Tim Bölke, CEO

---

<sup>27</sup> <http://pharma.bayer.com>

<sup>28</sup> <http://www.metanomics-health.com/en/management.html>



<p><b>UK</b></p>	<p><b>UK Institute for Health and Biomedical Informatics Research<sup>29</sup></b>          The College is a member of the Francis Crick Institute together with the MRC, Wellcome Trust, CRUK, UCL and KCL. As part of this, Imperial College has submitted an Expression of interest to become a substantive site of the UK Institute for Health and Biomedical Informatics Research. The focus of this application is on new knowledge generation from public health, population, clinical, cellular and linked omics datasets (including Phenomenal analysis pipelines and infrastructure), skills and training applied to relevant patient needs based on the wealth of data generated across the IC healthcare landscape. This could sustain the instance of Phenomenal on the UK MedBio infrastructure.</p> <p><b>UKMedBio / Medical Research Council<sup>30</sup></b>          Phenomenal is using UKMedBio (MRC funded £6M infrastructure investment) as a test case for bringing the compute to the data and also using this large infrastructure to conduct scalability and optimisation testing. Imperial College London is involved in this project.</p>
<p><b>Netherlands</b></p>	<p><b>X-omics initiative<sup>31</sup></b>          The Netherlands X-omics initiative, is a € 16 million national research infrastructure application building a state-of-the art research infrastructure on metabolomics, proteomics, genomics and the data integration thereof. To realize this infrastructure, funding has been requested from the Roadmap Large Scale Research Infrastructures at the National Science Foundation (In total a budget will be available for Life Sciences of € 45 million in 2017 and € 45 million in 2019).</p> <p>PhenoMeNal is included as a platform for analysing the metabolomics data and for data integration. The project application is currently being evaluated. Funding would anchor PhenoMeNal in the Netherlands.</p>
<p><b>Sweden</b></p>	<p><b>Tryggve<sup>32</sup></b> is a three-year project to establish a Nordic platform for collaboration on sensitive data, funded by NeIC and the ELIXIR nodes in Denmark, Finland, Norway</p>

<sup>29</sup> <http://www.farrinstitute.org/>

<sup>30</sup> <http://www.imperial.ac.uk/uk-med-bio>

<sup>31</sup> <http://x-omics.nl/>

<sup>32</sup> <https://wiki.neic.no/wiki/Tryggve>



and Sweden. The approach in the project is to utilize and connect existing capacities and services at the Nordic countries. The work is conducted in close collaboration with the user communities and Nordic e-infrastructure providers.

*Status:* PhenoMeNal has been brought forward as a use case in the upcoming Tryggve 2 project, and is currently being evaluated. This would anchor PhenoMeNal in the nordic domain.

**NBIS**<sup>33</sup>, National Bioinformatics Infrastructure Sweden, is a distributed national research infrastructure supported by the Swedish Research Council (Vetenskapsrådet), Science for Life Laboratory, all major Swedish universities and the Knuth and Alice Wallenberg Foundation, providing state-of-the-art bioinformatics to the Swedish life science researchers community. NBIS is also the Swedish contact point to the European infrastructure for biological information ELIXIR. NBIS can support e-infrastructure project based in an internal selection process. Right now NBIS supports the development of e.g. Human Metabolic Atlas.

*Status:* NBIS has supported PhenoMeNal since its start by employing software engineers that are hired to work on PhenoMeNal. Discussions on the future sustaining PhenoMeNal in Sweden are ongoing.

---

<sup>33</sup> <http://nbis.se/>



## Individual Country reports

### United Kingdom

*Update on champions / ambassadors, users (academic and industrial), (potential) contributors to PhenoMeNal and policy measures relevant to PhenoMeNal sustainability*

Who do we target	What do we want to achieve	Who takes action	What are we going to do?
<b>Potential champions / ambassadors</b>			
<b>Albert Koulman</b> NIHR BRC Clinical Metabolomics and Lipidomics Laboratory, Cambridge	Application of PhenoMeNal in Clinical / Biomedical Metabolomics and Lipidomics	Ralf Weber, James Bradbury	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>Potential users (academic and industrial) of PhenoMeNal</b>			
<b>David Barrett</b> <sup>34</sup>	Application of PhenoMeNal in Clinical / Biomedical Metabolomics and Lipidomics	Ralf Weber, James Bradbury	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>Karl Burgess</b> <sup>35</sup>	Application of PhenoMeNal in Clinical / Biomedical Metabolomics and Lipidomics	Ralf Weber, James Bradbury	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>James MacRae</b> <sup>36</sup>		Ralf Weber, James Bradbury	Organize a meeting (online/offline) and demonstrate PhenoMeNal

<sup>34</sup> <https://www.nottingham.ac.uk/pharmacy/people/david.barrett>

<sup>35</sup> <http://www.gla.ac.uk/researchinstitutes/iii/staff/karlbουργess>

<sup>36</sup> <https://www.crick.ac.uk/research/science-technology-platforms/metabolomics>



<b>Benedikt Kessler</b> <sup>37</sup>	Application of PhenoMeNal in Clinical / Biomedical Metabolomics and Lipidomics	Ralf Weber, James Bradbury, Philippe Rocca-Serra	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>Victoria Vazquez</b> Genetics & Molecular Medicine Twin Research & Genetic Epidemiology victoria.vazquez@kcl.ac.uk	Application of PhenoMeNal in Clinical / Biomedical Metabolomics to Twin studies	Philippe Rocca-Serra	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>Prof. Jim Davies, CTO</b> (jim.davies@cs.ox.ac.uk) <b>Genomics England</b>	Application of PhenoMeNal in Clinical /	Philippe Rocca-Serra	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>Potential contributors (instrument vendors or others)</b>			
<b>Prof Yike Guo</b> Data Science Institute, Imperial College London		Philippe Rocca-Serra	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>Update on missing or new (e-)infrastructures</b>			
<b>FARR institute</b>	Dr. Jacky Pallas (University College London)	See below	<a href="http://www.farrinstitute.org/">http://www.farrinstitute.org/</a>
<b>Relevant national (policy or funding) research infrastructure initiatives that could support the continued development of PhenoMeNal + status thereof (for instance proposal has been submitted) + parties involved + link to website of funding agency/call description</b>			
<b>UK Institute for Health and Biomedical Informatics Research</b> <sup>38</sup> Imperial is a member of the Francis Crick Institute together with the MRC, Wellcome Trust, CRUK, UCL and KCL. As part of this Imperial College has submitted an			

<sup>37</sup> <http://www.tdi.ox.ac.uk/metabolomics-lipidomics>

<sup>38</sup> <http://www.farrinstitute.org/>





Expression of interest to become a substantive site of the UK Institute for Health and Biomedical Informatics Research. The focus of this application is on new knowledge generation from public health, population, clinical, cellular and linked omics datasets (including Phenomenal analysis pipelines and infrastructure), skills and training applied to relevant patient needs based on the wealth of data generated across the IC healthcare landscape. This could sustain the instance of Phenomenal on the UK MedBio infrastructure.

#### **UKMedBio / Medical Research Council<sup>39</sup>**

Phenomenal is using UKMedBio (MRC funded £6M infrastructure investment) as a test case for bringing the compute to the data and also using this large infrastructure to conduct scalability and optimisation testing. Imperial College London is involved in this project.

#### **Clinical Infrastructure call in UK which led to funding of Phenome Centre Birmingham**

In 2013, the UK Medical Research Council in partnership with the Department of Health, Wellcome Trust, Cancer Research UK, British Heart Foundation, Arthritis Research UK and UK Research Councils, launched a £150m strategic initiative in clinical research infrastructure to provide capital for new research technologies in clinical studies. The overall objective of the initiative was to support innovation in clinical research, specifically to fund novel technologies and facilities which will most effectively advance the UK's ability to explore new areas in clinical research. A successful bid by the University of Birmingham - *Integrating innovative technologies for genotyping and phenotyping in stratified medicine* - funded the £8m Phenome Centre Birmingham that was opened by Sir Mark Walport, UK Government Chief Science Advisor in May 2016.

#### **UK MRC-NIHR National Phenome Centre<sup>40</sup>**

The UK Medical Research Council (MRC) in collaboration with the National Institute for Health Research (NIHR) funded the £10m National Phenome Centre (NPC) which was opened in June 2013. The NPC aims to deliver broad access to a world-class capability in high throughput metabolic phenotyping, that will benefit the whole UK translational medicine community.

#### **International Phenome Centre Network<sup>41</sup>**

The International Phenome Centre Network is a research consortium working to

<sup>39</sup> <http://www.imperial.ac.uk/uk-med-bio>

<sup>40</sup> <http://phenomecentre.org>

<sup>41</sup> <http://phenomenetwork.org/index.html>



transform health care globally and improve disease prevention, detection and treatment by understanding the dynamic interactions between our genes, environments, microbiomes, diets and lifestyles and their expression in diverse individuals and populations. The Network links a number of Phenome Centres across the globe, and aims to promote harmonisation and standardisation of high throughput metabolomic technology.

***Update on contacts with (e-)infrastructures from previous mapping exercise M6***

<b>Infrastructure Name</b>	<b>Contact person and role</b>	<b>Interactions so far</b>	<b>Contact details (phone or email)</b>
<b>ARCHER</b>		No interactions so far	
<b>UK BioBank<sup>42</sup></b>	Dr. Tim Peakman	Discussed capabilities of UK National Phenome Centre and Phenome Centre Birmingham for metabolic profiling of UK Biobank samples	tim.peakman@ukbiobank.ac.uk
<b>NIHR Biomedical Research Centres/Units (BRC/BRU)<sup>43</sup></b>		No interactions so far	
<b>NIHR Health Informatics Collaborative</b>		No interactions so far	
<b>MRC/NIHR National Phenome Centre</b>		No interactions so far	
<b>NIHR Healthcare Technology Cooperatives</b>		No interactions so far	
<b>NIHR Biosample Centre</b>		No interactions so far	

<sup>42</sup> <http://www.ukbiobank.ac.uk>

<sup>43</sup> <https://www.nihr.ac.uk/about-us/how-we-are-managed/our-structure/infrastructure/biomedical-research-centres.htm>



<b>NIHR BioResource</b>		No interactions so far	
<b>Alan Turing Institute<sup>44</sup></b>		No interactions so far	
<b>Dementias Platform UK<sup>45</sup></b>	Prof. John Gallacher	Discussed capabilities of UK National Phenome Centre and Phenome Centre Birmingham for metabolic profiling of Dementias Platform UK samples	john.gallacher@psych.ox.ac.uk
<b>Collaborative Open Plant Omics platform<sup>46</sup></b>	Dr Robert Davey	Regular updates of the PhenoMenal progress for application to Plant Metabolic Phenotyping	robert.davey@earlham.ac.uk
<b>The Digital Catapult<sup>47</sup></b>		No interactions so far	
<b>EPSRC IoT Research Hub</b>		No interactions so far	
<b>ELIXIR UK Node</b>	Prof. Carole Goble	Discussed metabolomics training within ELIXIR UK (potential to develop PhenoMeNal training as part of ELIXIR UK	carole.goble@manchester.ac.uk

<sup>44</sup> <https://www.turing.ac.uk>

<sup>45</sup> <https://www.dementiasplatform.uk>

<sup>46</sup> <https://copo-project.org>

<sup>47</sup> <https://digital.catapult.org.uk>



		resource)	
<b>Internet of Things Cities Demonstrator (Manchester)</b>		No interactions so far	
<b>UK Data Archive</b>		No interactions so far	



## The Netherlands

*Update on champions / ambassadors, users (academic and industrial), (potential) contributors to PhenoMeNal and policy measures relevant to PhenoMeNal sustainability*

<b>Who do we target</b>	<b>What do we want to achieve</b>	<b>Who takes action</b>	<b>What are we going to do?</b>
<b>Potential champions / ambassadors</b>			
<b>Hans Clevers<sup>48</sup></b>	Application of PhenoMeNal in organoid cancer research	Thomas Hankemeier	Organize a meeting with the Clevers team, potentially involving Px and Gx researchers too
<b>Cisca Wymenga<sup>49</sup> / Cornelia van Duijn<sup>50</sup> / Eline Slagboom</b>	Application of PhenoMeNal in BBMRI-NL Biobank research of Life Lines Deep cohort and Rotterdam Study	Thomas Hankemeier	Organize a meeting with the BBMRI-NL team, potentially involving Px and Gx researchers too
<b>Potential users (academic and industrial) of PhenoMeNal</b>			
<b>Rob Vreeken / Janssen Pharmaceuticals</b>	Application of PhenoMeNal in pharma company	Thomas Hankemeier / Merlijn van Rijswijk / Amy Harms / Michael van Vliet	Organize a meeting at Janssen Pharmaceuticals in Beerse, demonstrating PhenoMeNal
<b>Alain van Gool / Radboudumc Nijmegen</b>	Application of PhenoMeNal in a University Medical Centre	Thomas Hankemeier / Merlijn van Rijswijk / Amy Harms / Michael	Organize a meeting at Radboudumc, demonstrating PhenoMeNal

<sup>48</sup> <http://hub4organoids.eu/about-us/team/hans-clevers/>

<sup>49</sup> <http://www.rug.nl/research/genetics/staff/cisca-wijmenga>

<sup>50</sup> <https://www.erasmusmc.nl/epid/51026/2581336/duijn-coch-van?lang=en/>



		van Vliet	
<b>Potential contributors (instrument vendors or others)</b>			
<b>Kees van Bochove</b> The Hyve	Support of the development of PhenoMeNal by an open source software developing company after the end of the project	Michael van Vliet	Give a demonstration of the PhenoMeNal infrastructure to the software developers of the Hyve
<b>Update on missing or new (e-)infrastructures</b>			
<b>Health RI</b>	Long-term vision on the future (digital) research infrastructure for biomedical and health research in the Netherlands. The X-omics proposal mentioned above in one of the corner stones for implementation of Health RI in conjunction with ELIXIR-NL	Research facility (proposal stage)	<a href="https://www.health-ri.org/">https://www.health-ri.org/</a>
<b>ELIXIR-NL</b>	ELIXIR-NL is the Dutch <i>node</i> in the European-wide <a href="#">ELIXIR</a> framework. ELIXIR-NL has the following bioinformatics focal areas: <ul style="list-style-type: none"> <li>• <a href="#">Standards &amp; tooling for data interoperability and</a></li> </ul>	Research facility	<a href="https://www.dtls.nl/elixir-nl/elixir-nl-2/">https://www.dtls.nl/elixir-nl/elixir-nl-2/</a>



	<ul style="list-style-type: none"><li>• <a href="#">exchange</a></li><li>• <a href="#">Compute and storage (e-)infrastructure services</a></li><li>• <a href="#">Training &amp; Education</a></li></ul>		
--	---	--	--

**Relevant national (policy or funding) research infrastructure initiatives that could support the continued development of PhenoMeNal + status thereof (for instance proposal has been submitted) + parties involved + link to website of funding agency/call description**

€16 million X-omics initiative funding by Roadmap Large Scale Research Infrastructures funded by National Science Foundation (€ 45 million in 2017 and € 45 million in 2019 for Life Sciences). Proposal submitted, Leiden University is metabolomics innovation lead, additional partners include ErasmusMC, LUMC and Radboudumc. Call information: <https://www.nwo.nl/en/funding/our-funding-instruments/nwo/national-road-map-large-scale-research-infrastructure/national-road-map-large-scale-research-infrastructure.html>



**Update on contacts with (e-)infrastructures from previous mapping exercise M6**

<b>Infrastructure Name</b>	<b>Contact person, role</b>	<b>Interactions so far</b>	<b>Contact details</b>
<b>SURF</b> <sup>51</sup>	Irene Nooren, community manager	The national needs for compute for the field of metabolomics have been discussed with SURF	irene.nooren@surfsara.nl
<b>4 TU Data Centre</b> <sup>52</sup>	Jasmin Böhmer, Research Data Officer	No contacts to date with 4TU Data Centre	j.k.boehmer@tudelft.nl
<b>Data Archiving and Networked Services (DANS)</b> <sup>53</sup>	Marjan Grootveld, senior policy advisor	DANS provides repository services and co-organizes courses at librarians	marjan.grootveld@dans.knaw.nl
<b>BBMRI-NL</b> <sup>54</sup>	Gerrit Meijer, co-director BBMRI-NL	A population study use case has been formulated for the national X-omics research infrastructure proposal	g.meijer@nki.nl
<b>Proteins@Work</b> <sup>55</sup>	Albert Heck, director proteins@work	A € 16 million national X-omics research infrastructure proposal has been drafted together with the proteomics and	A.J.R.Heck@uu.nl

<sup>51</sup> <https://www.surf.nl/en>

<sup>52</sup> <http://researchdata.4tu.nl/en/home/>

<sup>53</sup> <https://dans.knaw.nl/en>

<sup>54</sup> <https://www.bbmri.nl>

<sup>55</sup> <http://www.netherlandsproteomicscentre.nl/paw>





		genomics community	
<b>Netherlands Metabolomics (NMC) Centre</b> <sup>56</sup>	Thomas Hankemeier, Scientific Director	NMC has organised an international workshop on establishing a metabolomics use case in ELIXIR and another workshop on establishing a metabolomics implementation network in the European Open Science Cloud	hankemeier@lacr. r.leidenuniv.nl
<b>CTMM / Lygature</b> <sup>57</sup>	Jan Willem Boiten, CTO Lygature	CTMM and TI Pharma have merged into a new organisation: Lygature. We are in contact with Lygature on defining X-omics projects	janwillem.boiten@ lygature.org
<b>NL-OPENSREEN</b> <sup>58</sup>	Huib Ovaa coordinator NL- Open Screen Steven van Velden, Pivot Park Screening Centre	No contacts have been initiated yet	<a href="mailto:h.ovaa@lumc.nl">h.ovaa@lumc.nl</a>  <a href="mailto:steven.vanhelden@ppscreeningcentre.com">steven.vanhelden @ppscreeningcen tre.com</a>
<b>Biomedical Metabolomics Leiden</b> <sup>59</sup>	Amy Harms, facility manager	Discussions are ongoing on the implementation of PhenoMeNal in	a.c.harms@leiden univ.nl

<sup>56</sup> <http://www.metabolomicscentre.nl>

<sup>57</sup> <http://www.lygature.org/ctmm-portfolio>

<sup>58</sup> <http://openscreen.nl>

<sup>59</sup> <https://www.universiteitleiden.nl/en/research/research-facilities/science/biomedical-metabolomics-facility-leiden>



		the workflow of the BMFL.	
--	--	---------------------------	--

## Sweden

*Update on champions / ambassadors, users (academic and industrial), (potential) contributors to PhenoMeNal and policy measures relevant to PhenoMeNal sustainability*

Who do we target	What do we want to achieve	Who takes action	What are we going to do?
<b>Potential champions / ambassadors</b>			
<b>Thomas Moritz</b> , Swedish Metabolomics Centre and Science for Life Laboratory	SMC should present PhenoMeNal as a way for their clients to analyze data SMC produces	Ola Spjuth	Present and demonstrate PhenoMeNal
<b>Potential users (academic and industrial) of PhenoMeNal</b>			
<b>Joakim Burman</b> , Uppsala University Hospital	Use in his clinical research group	Kim Kultima	Meet and present PhenoMeNal
<b>Craig Wheelock</b> / Karolinska Institutet, Sweden	Foster adoption	Kim Kultima	PhenoMeNal demo
<b>Daniel Globish</b> / Uppsala University, Sweden	Application of PhenoMeNal in their Metabolomic analysis	Kim Kultima	PhenoMeNal demo
<b>Potential contributors (instrument vendors or others)</b>			
Not yet			
<b>Update on missing or new (e-)infrastructures</b>			
SNIC-Cloud	PhenoMeNal groups are	e-infrastructure	<a href="https://cloud.snic.se/">https://cloud.snic.se/</a>



	involved in the national strategies on how to shape the future cloud-based infrastructures in Sweden.		
<p><b>Relevant national (policy or funding) research infrastructure initiatives that could support the continued development of PhenoMeNal + status thereof (for instance proposal has been submitted) + parties involved + link to website of funding agency/call description</b></p>			
<p><b>NBIS</b>, National Bioinformatics Infrastructure Sweden, (<a href="http://nbis.se/">http://nbis.se/</a>) is a distributed national research infrastructure supported by the Swedish Research Council (Vetenskapsrådet), Science for Life Laboratory, all major Swedish universities and the Knuth and Alice Wallenberg Foundation, providing state-of-the-art bioinformatics to the Swedish life science researchers community. NBIS is also the Swedish contact point to the European infrastructure for biological information ELIXIR. NBIS can support e-infrastructure project based in an internal selection process. Right now NBIS supports the development of e.g. Human Metabolic Atlas.</p> <p><i>Status:</i> NBIS has supported PhenoMeNal since start by employing software engineers that are hired to PhenoMeNal. Discussions on future sustaining PhenoMeNal in Sweden are ongoing.</p> <p><b>Tryggve</b> (<a href="https://wiki.neic.no/wiki/Tryggve">https://wiki.neic.no/wiki/Tryggve</a>) is a three-year project to establish a Nordic platform for collaboration on sensitive data, funded by NeIC and the ELIXIR nodes in Denmark, Finland, Norway and Sweden. The approach in the project is to utilize and connect existing capacities and services at the Nordic countries. The work is conducted in close collaboration with the user communities and Nordic e-infrastructure providers.</p> <p><i>Status:</i> PhenoMeNal has been brought forward as a use case in the upcoming Tryggve 2 project, and is currently being evaluated. This would anchor PhenoMeNal in the nordic domain.</p> <p><b>Glenna and Glenna2</b> (<a href="https://wiki.neic.no/wiki/Glenna2">https://wiki.neic.no/wiki/Glenna2</a>): The goal of this Nordic Cloud project is to share knowledge and set best practices on managing cloud services and to create a Nordic federated cloud service, driven by the need of the Nordic researchers.</p> <p><i>Status:</i> PhenoMeNal has been suggested as one of the case studies to use in the federated cloud developments.</p>			



*Update on contacts with (e-)infrastructures from previous mapping exercise M6*

<b>Infrastructure Name</b>	<b>Contact person and role</b>	<b>Interaction so far</b>	<b>Contact details (email or phone)</b>
<b>NBIS</b>	Bengt Persson, Director	Discussions on how PhenoMeNal can be integrated as a nationally supported resource by NBIS.	bengt.persson@icm.uu.se
<b>SNIC</b>	Andreas Hellander, project leader SNIC-Cloud	SNIC-Cloud has offered free resources for the running of PhenoMeNal VREs in Sweden. Has been used by PhenoMeNal team and CARAMBA facility.	andreas.hellander@it.uu.se
<b>SciLifelab</b>	Ola Spjuth, Head of Compute and Storage Facility	Investigations on how SciLifeLab can take advantage of cloud computing infrastructures to support e.g. PhenoMeNal. Also discussions on how metabolomics and genomics can meet in VREs.	ola.spjuth@farmbio.uu.se
<b>BBMRI-SE</b>	Jan-Eric Litton, Director-General	None	jan-eric.litton@bbmri-eric.eu
<b>CARAMBA</b>	Kim Kultima, Head of CARAMBA	CARAMBA team has been heavily involved with use cases and testing	kim.kultima@medsci.uu.se



		as well as workflow development in PhenoMeNal.	
<b>Swedish Metabolomics Centre</b>	Platform Director Thomas Moritz	Swedish Metabolomics Centre is a platform within the national centre Science for Life Laboratory in Sweden. No interactions so far.	Thomas.Moritz@s lu.se
<b>NCMSI</b>	Contact person: Per Andren	The National Center for Mass Spectrometry Imaging (NCMSI) is a pilot platform within the national centre Science for Life Laboratory in Sweden. Ongoing discussions on arranging a combined metabolomics/imaging conference in Uppsala in 2018	per.andren@farm bio.uu.se
<b>eSSENCE</b>	Per Lötstedt, Director	Discussions on future e-Science investments relevant for PhenoMeNal.	per.lotstedt@it.uu. se
<b>SERC</b>	Juni Palmgren, PI and board member	Presented PhenoMeNal at internal seminar. Discussions on needs with PIs involved in metabolomics.	Juni.Palmgren@ki .se



## Spain

*Update on champions / ambassadors, users (academic and industrial), (potential) contributors to PhenoMeNal and policy measures relevant to PhenoMeNal sustainability*

<b>Who do we target</b>	<b>What do we want to achieve</b>	<b>Who takes action</b>	<b>What are we going to do?</b>
<b>Potential champions / ambassadors</b>			
Not yet			
<b>Potential users (academic and industrial) of PhenoMeNal</b>			
<b>Jesús Vázquez / Alessia Ferrarini</b> , Centro Nacional de Investigaciones Cardiovasculares Carlos III (CNIC)	Project PESA (Progression of Early Subclinical Atherosclerosis) into the use of imaging techniques to detect the prevalence and rate of progression of subclinical vascular lesions in a population study. The study examines the association of these clinical parameters with the presence of genetic, epigenetic, metabolomic, proteomic and environmental factors	Pedro de Atauri / Marta Cascante	We will contact and organize a meeting
<b>Nuria Canela /</b> Centre for Omics Sciences - Universitat Rovira i Virgili	The center includes an array of Agilent	Pedro de Atauri / Marta Cascante	They have been contacted and are interested in a



(tarragona, Spain)	instruments and software solutions. Combination of genomics, transcriptomics, proteomics, and metabolomics		possible workflow for program MetaboAnalyst. Also, they developed a tool for deconvolution in Phyton in the platform and that if we are interested we can put in container and use in any workflow
<b>Coral Barbas</b> / Universidad CEU San Pablo	Agilent analytical platform  Recently, involved in metabolomic studies, not only from the application, but also from the method development.	Pedro de Atauri / Marta Cascante	We will contact and organize a meeting
<b>Romà tauler</b> / Consejo Superior de Investigaciones Científicas (CSIC)	Studies in Chemometrics	Pedro de Atauri / Marta Cascante	We plan to contact and if they agree we will organize a meeting
<b>Potential contributors (instrument vendors or others)</b>			
Not yet			
<b>Update on missing or new (e-)infrastructures</b>			
<b>Health Institute Carlos III - Bioinformatics Platform - National Institute of Bioinformatics (INB). Platform directly connected with the Spanish node of Elixir</b>	Salvador Capella & Alfonso Valencia  General coordinators	Carlos III participates in BBMRI, ELIXIR, EATRIS, ECRIN and ERINHA and sponsors the National Institute	scapella@cniio.es (+34) 91 732 80 00 EXT 3750



		of Bioinformatics and the DNA national data bank	
<b>Centre for Omics Sciences</b>	Nuria Canela Technical coordinator	COS offers analytical services, metabolic consulting, and advice on omics-related experiments.	<a href="mailto:info@omicscentre.com">info@omicscentre.com</a> nuria.canela@eurcat.org
<p><b>Relevant national (policy or funding) research infrastructure initiatives that could support the continued development of PhenoMeNal + status thereof (for instance proposal has been submitted) + parties involved + link to website of funding agency/call description</b></p>			
<p>At present, there are no existing infrastructure initiatives in Spain that could support the continued development Phenomenal. However, in May 2017 an application has been submitted for the renewal of the Bioinformatics Platform of Health Institute Carlos III- (Platform connected to National Institute of Bioinformatics and Elixir Spanish Node) and the Marta Cascante team (University of Barcelona) has been invited to join this platform as a small node of metabolomics to contribute to the crosstalk between Elixir and Phenomenal tools.</p>			

*Update on contacts with (e-)infrastructures from previous mapping exercise M6*

<b>Infrastructure Name</b>	<b>Contact person and role</b>	<b>Interaction so far</b>	<b>Contact details (email or phone)</b>
<b>Barcelona Supercomputing Center - Centro nacional de Supercomputación (BSC-CNS)</b> <a href="https://www.bsc.es/">https://www.bsc.es/</a>	Mateo Valero Cortes, Director	Included in the Spanish Supercomputing Network (RES). Supercomputing center is not dealing with metabolomics at present. Inside the BSC there are some groups that	mateo.valero@bsc.es





		<p>belong to the Spanish node of Elixir and the INB-Institute of Health Carlos III (ISCIII). These groups are not working in metabolomics but in the application for the renewal of the ISCIII-Bioinformatics platform on May-2017, the team of Marta Cascante has been included as a small node of metabolomics to facilitate the links between Elixir and Phenomenal.</p>	
<p><b>PRB2 (Biomolecular and Bioinformatics Resources Platform)</b>  <a href="http://www.prb2.org/home">http://www.prb2.org/home</a></p>	<p>Fernando Corrales, PRB2 General Coordinator</p>	<p>We have contacted him by email. The platform is devoted to proteomics. They are open to interact with us but they are not planning to expand to metabolomics at present.</p>	<p><a href="http://www.prb2.org/contact-us">http://www.prb2.org/contact-us</a></p>
<p><b>SIDIAP (Information System for Research in Primary Care)</b>  <a href="http://www.sidiap.org/index.php/en">http://www.sidiap.org/index.php/en</a></p>	<p>Technical Secretary: Anna Molas / Mari Fernández</p>	<p>We will contact them by email</p>	<p>sidiap@idiapjgol.info</p>



Who do we target	What do we want to achieve	Who takes action	What are we going to do?
<b>Potential champions / ambassadors</b>			
<b>Prof. Hannelore Daniel</b> TU Munich	For her to act as multiplier amongst clinical academics in Germany	Christoph Steinbeck	Give a presentation at TU Munich
<b>Potential users (academic and industrial) of PhenoMeNal</b>			
<b>Dr. Martin Boeker</b> , Freiburg University Clinic (UKLFR)	Check if UKLFR has suitable data pipelines that could be run in Phenomenal.	Daniel Schober	Ask if Martin Boeker (and Stefan Schulz) know someone at Freiburg University Clinic (or Graz) that would be interested in testing PhenoMeNal
<b>Nicolas Schauer</b> Metabolomics Discoveries <a href="http://www.metabolomicdiscoveries.com/">http://www.metabolomicdiscoveries.com/</a>	Adoption of PhenoMeNal pipeline in industry	Steffen Neumann	Reach out to existing contacts Nicolas Schauer
<b>Potential contributors (instrument vendors or others)</b>			
Bayer Pharma AG 13342 Berlin	Adoption of PhenoMeNal pipeline in industry	Christoph Steinbeck	Reach out to existing contacts Bertram Weiss and Mark Ott
Metanomics Health.	Adoption of PhenoMeNal pipeline in industry	Christoph Steinbeck	Tim Bölke, CEO
<b>Update on missing or new (e-)infrastructures</b>			



**Relevant national (policy or funding) research infrastructure initiatives that could support the continued development of PhenoMeNal + status thereof (for instance proposal has been submitted) + parties involved + link to website of funding agency/call description**

### Germany

*Update on champions / ambassadors, users (academic and industrial), (potential) contributors to PhenoMeNal and policy measures relevant to PhenoMeNal sustainability.*

*Update on contacts with (e-)infrastructures from previous mapping exercise M6*

<b>Infrastructure Name</b>	<b>Contact person and role</b>	<b>Interaction so far</b>	<b>Contact details (email or phone)</b>
<b>German Network for Bioinformatics Infrastructure</b>	Steffen Neumann	In interaction with DENBI a Metabolomics and Proteomics use case for ELIXIR has been drafted and presented to ELIXIR	contact@denbi.de
<b>CMP</b>		No interactions so far	
<b>Plant Metabolism and Metabolomics Laboratories</b>	Dirk Walther, Max Planck Institute of Molecular Plant Physiology Bioinformatics		<a href="http://www.mpimp-golm.mpg.de/bioinformatics">http://www.mpimp-golm.mpg.de/bioinformatics</a> Walther@mpimp-golm.mpg.de +49 331 567-8108



## France

*Update on champions / ambassadors, users (academic and industrial), (potential) contributors to PhenoMeNal and policy measures relevant to PhenoMeNal sustainability*

<b>Who do we target</b>	<b>What do we want to achieve</b>	<b>Who takes action</b>	<b>What are we going to do?</b>
<b>Potential champions / ambassadors</b>			
<b>Christophe Junot (CEA)</b>	Application of PhenoMeNal in Clinical/Biomedical Metabolomics	Etienne Thévenot	Organize a meeting (online/offline) and demonstrate PhenoMeNal
<b>Potential users (academic and industrial) of PhenoMeNal</b>			
<b>MedDay Pharmaceutical</b> Mass spec facility - Dr Sandrine Aros	Foster adoption, already aware of initiative	Fabien Jourdan	Ask them to deploy and test
<b>Dr Benedicte Elena - Herrmann.</b> Lyon Ecole Nationale Supérieure chemistry lab	Foster adoption	Fabien Jourdan	Inform about the initiative
<b>BIOASTER</b> Institut Pasteur and Lyonbiopole Technology Research Institute	Foster adoption	Fabien Jourdan	Find contact of Inform about the initiative
<b>SANOFI</b>	Foster adoption	Fabien Jourdan	Find contact of Inform about the initiative
<b>Stanislas Grassin Delye</b> (Paris Saclay University, Foch Hospital)	Application of PhenoMeNal in Clinical/Biomedical Metabolomics	Etienne Thévenot	Organize a meeting (online/offline) and demonstrate PhenoMeNal



<b>Potential contributors (instrument vendors or others)</b>			
Not yet			
<b>Update on missing or new (e-)infrastructures</b>			
<b>ELIXIR-FR</b>	Elixir-FR (IFB) node is also divided into sub-nodes. Main one involved is the Toulouse one (cf next line)	Bioinformatics facility	Claudine Médigue <cmedigue@genoscope.cns.fr>
<b>Toulouse INRA Data centre and bioinformatics facility</b>	<p>This facility hosts W4M instance and computation cores used through Galaxy.</p> <p>This was the facility planned to be involved in the PhenoMeNal proposal. The virtual machine is secured for 6 years wm4 : 8vCPU, 16Go RAM, 50Go drive. We also secured computations hours for the next 6 years.</p>	Bioinformatics facility	<a href="http://bioinfo.genotoul.fr/">http://bioinfo.genotoul.fr/</a>
<b>Relevant national (policy or funding) research infrastructure initiatives that could support the continued development of PhenoMeNal + status thereof (for instance proposal has been submitted) + parties involved + link to website of funding agency/call description</b>			
<p>The <b>Workflow4Metabolomics</b> e-infrastructure (W4M) develops Galaxy workflows for MS and NMR metabolomics data preprocessing, statistical analysis, and annotation. Examples of W4M contributions to PhenoMeNal include the integration of several statistical modules, and the development of a new tool to directly upload datasets from</p>			



the MetaboLights repository into PhenoMeNal workflows. W4M is supported by two national infrastructures: the French Institute of Bioinformatics (IFB) and the infrastructure for Metabolomics and Fluxomics (MetaboHUB).

*Update on contacts with (e-)infrastructures from previous mapping exercise M6*

<b>Infrastructure Name</b>	<b>Contact person and role</b>	<b>Interaction so far</b>	<b>Contact details (email or phone)</b>
<b>French Institute of Bioinformatics (IFB)</b>	Christophe Caron, in charge of metabolomics aspects at IFB	Coordinator of W4M development and deployment on INRA Toulouse Data Centre	christophe.caron@inra.fr
<b>MetaboHUB</b>	Dominique Rolin, chair of the national infrastructure	Involved in Elixir discussions for Excelerate.	dominique.rolin@inra.fr

### Italy

*Update on champions / ambassadors, users (academic and industrial), (potential) contributors to PhenoMeNal and policy measures relevant to PhenoMeNal sustainability*

<b>Who do we target</b>	<b>What do we want to achieve</b>	<b>Who takes action</b>	<b>What are we going to do?</b>
<b>Potential champions / ambassadors</b>			
Will come from interacting with potential users			
<b>Potential users (academic and industrial) of PhenoMeNal</b>			
University of Verona - Metabolomics lab	Foster adoption	Antonio Rosato	PhenoMeNal demo
Laboratorio di Risonanza Magnetica "Annalaura Segre"	Foster adoption	Leonardo Tenori	PhenoMeNal demo



Dipartimento di Scienza Applicata e Tecnologia, Politecnico di Torino	Foster adoption	Leonardo Tenori	PhenoMeNal demo
Dipartimento di Scienze e Tecnologie Agro-Alimentari, U. Bologna	Foster adoption	Leonardo Tenori	PhenoMeNal demo
Dipartimento di Scienze e Tecnologie Biologiche ed Ambientali, U. Salento	Foster adoption	Antonio Rosato	PhenoMeNal demo
<b>Potential contributors (instrument vendors or others)</b>			
Not yet			
<b>Update on missing or new (e-)infrastructures</b>			
SYSBIO	Centre of Systems Biology	MS-based metabolomics	
<b>Relevant national (policy or funding) research infrastructure initiatives that could support the continued development of PhenoMeNal + status thereof (for instance proposal has been submitted) + parties involved + link to website of funding agency/call description</b>			
<p>Italian roadmap for infrastructures (updated in 2017): <a href="http://www.ponrec.it/ponri/notizie/2017/pnir/">http://www.ponrec.it/ponri/notizie/2017/pnir/</a></p> <p>CIRMMP is involved in INSTRUCT and has interactions with BBRMI-IT.</p> <p>There are also several actions in the agrifood sector.</p>			

*Update on contacts with (e-)infrastructures from previous mapping exercise M6*

<b>Infrastructure Name</b>	<b>Contact person and role</b>	<b>Interaction so far</b>	<b>Contact details (email or phone)</b>
<b>Consortium GARR</b>	Eugenio Dibilio  Access port manager (APM) at the University of Florence	GARR provides connectivity and cloud services to the Italian academic and research community	eugenio.dibilio@unifi.it



<b>CINECA</b>	Giuseppe Fiameni, Giovanni Morelli  In charge of EC projects	Discussion about the use of EUDAT services	<a href="mailto:g.fiameni@cineca.it">g.fiameni@cineca.it</a>  g.morelli@CINECA.IT
<b>INFN</b>	Davide Salomoni  Coordinator of INDIGO-DataCloud	Collaboration on the implementation and use of INDIGO-DataCloud solutions	davide.salomoni@cnafe.infn.it
<b>INFN-CNAF</b>	Doina Cristina Aiftimiei	Usage of OneData (cloud storage) on the INFN cloud	cristina.aiftimiei@cnafe.infn.it
<b>Istituto Superiore di Sanità</b>	Elena Bravo Italian delegate in BBMRI-ERIC	Involved in BBMRI-IT  National node of EATRIS (IATRIS, see below)	<a href="mailto:elena.bravo@iss.it">elena.bravo@iss.it</a>
<b>Istituti di Ricovero e Cura a Carattere Scientifico</b>	Fondazione Monasterio	IATRIS centers	
<b>Telethon foundation</b>		No contact yet	
<b>BBMRI-IT</b>	Marialuisa Lavitrano  National contact	Involvement of the Florence biobank in BBMRI Use of metabolomics for biobank	marialuisa.lavitrano@unimib.it
<b>IATRIS</b>	Filippo Belardelli Director	National node of EATRIS	eatris@iss.it





## Switzerland

*Update on champions / ambassadors, users (academic and industrial), (potential) contributors to PhenoMeNal and policy measures relevant to PhenoMeNal sustainability*

<b>Who do we target</b>	<b>What do we want to achieve</b>	<b>Who takes action</b>	<b>What are we going to do?</b>
<b>Potential champions / ambassadors</b>			
Need to come from interactions with potential users			
<b>Potential users (academic and industrial) of PhenoMeNal</b>			
Aurélien Thomas	Application of PhenoMeNal in academia	Sven Bergmann	Organize a meeting at University of Lausanne, demonstrating PhenoMeNal
<b>Potential contributors (instrument vendors or others)</b>			
Not yet			
<b>Update on missing or new (e-)infrastructures</b>			
<b>Swiss Institute of Bioinformatics</b>	The SIB Swiss Institute of Bioinformatics is an independent, non-profit foundation that includes some 65 bioinformatics research and service groups and some 800 scientists from the major Swiss schools of higher education and		<a href="http://www.sib.swiss/">http://www.sib.swiss/</a>



	research institutes.		
<b>Metabolomics Unit</b>	Service and research platform to provide the state-of-the-art mass spectrometry-based, small molecule analyses with a wide range of applications in biochemistry, evolutionary biology and ecology, biomedical research and personalized approach to medicine	Research facility	<a href="https://www.unil.ch/metabolomics/home.html">https://www.unil.ch/metabolomics/home.html</a>
<b>Relevant national (policy or funding) research infrastructure initiatives that could support the continued development of PhenoMeNal + status thereof (for instance proposal has been submitted) + parties involved + link to website of funding agency/call description</b>			

*Update on contacts with (e-)infrastructures from previous mapping exercise M6*

<b>Infrastructure Name</b>	<b>Contact person and role</b>	<b>Interaction so far</b>	<b>Contact details (email or phone)</b>
<b>Vital-IT</b>		No interactions so far	
<b>Swiss Biobanking Platform (SBP)</b>		No interactions so far	



## Update on (potential) Users at ESFRIs

Update on contacts with (e-)infrastructures from previous mapping exercise M6\*

ESFRI	Name contact person and role	Interactions so far	Contact details (phone or email)
<b>Biomedbridges</b>		Project concluded. CORBEL has taken over some of its activities	
<b>BBMRI</b>	Jan-Eric Litton, director of BBMRI-ERIC	Interaction on various follow-up projects including H2020 infrastructure proposal MetaStar and outreach to the biobanking community	jan-eric.litton@bbmri-eric.eu
<b>CORBEL</b>	Niklas Blomberg Coordinator	PhenoMeNal presented at the first annual meeting of CORBEL	niklas.blomberg@elixir-europe.org
<b>EATRIS<sup>60</sup></b>	David Morrow Project Manager	Participated in Round Table on RI usage together with PhenoMeNal	davidmorrow@eatris.eu
<b>ECRIN<sup>61</sup></b>	Serena BATTAGLIA Project Manager	Participated in Round Table on RI usage together with PhenoMeNal	Serena.BATTAGLIA@ecrin.org

<sup>60</sup> <https://eatris.eu>

<sup>61</sup> <http://www.ecrin.org>



<b>ELIXIR</b>	Steven Newhouse Head of Technical Services	PhenoMeNal to support Metabolomics use case of ELIXIR	steven.newho use@ebi.ac.u k
<b>EMBRC<sup>62</sup></b>		No interactions so far	
<b>Erinha<sup>63</sup></b>		No interactions so far	
<b>EU-OPENSREEN<sup>64</sup></b>	Bahne Stechmann Project Manager	Participated in Round Table on RI usage together with PhenoMeNal	stechmann@f mp-berlin.de
<b>EuroBioImaging<sup>65</sup></b>	Silvio Aime Responsible for Medical Imaging	The Italian nodes of EUBI and INSTRUCT co- signed a MoU referring to PhenoMeNal for metabolomics	silvio.aime@u nito.it
<b>Infrafrontier<sup>66</sup></b>		No interactions so far	

---

<sup>62</sup> <http://www.embrc.eu>

<sup>63</sup> <http://www.erinha.eu>

<sup>64</sup> <http://www.eu-openscreen.eu>

<sup>65</sup> <http://www.eurobioimaging.eu>

<sup>66</sup> <https://www.infrafrontier.eu>



<b>INSTRUCT</b> <sup>67</sup>	Lucia Banci Head of Italian node	The Italian nodes of EUBI and INSTRUCT co- signed a MoU referring to PhenoMeNal for metabolomics Participated in Round Table on RI usage together with PhenoMeNal	banci@cerm. unifi.it
<b>ISBE</b> <sup>68</sup>	Vitor Martins dos Santos Leader of WP7 (Strategy, Vision & Advocacy)	Involved in systems biology working group Participated in Round Table on RI usage together with PhenoMeNal	vdsmaill@gmail.com
<b>MIRRI</b> <sup>69</sup>		No interactions so far	

\*This list does not include names of infrastructures where suitable contacts have not been established

---

<sup>67</sup> <https://www.structuralbiology.eu>

<sup>68</sup> <http://project.isbe.eu>

<sup>69</sup> <http://www.mirri.org/home.html>



## Update on (potential) collaborators at other e-infrastructures

Update on contacts with (e-)infrastructures from previous mapping exercise M6

(e-) infrastructure	Name contact person and role	Interactions so far	Contact details (phone or email)
<b>IndigoDataCloud</b> <sup>70</sup>	Davide Salomoni Coordinator	Discussions established	davide.salomoni@cnaif.infn.it
<b>i~HD</b>	Dipak Kalra (President)	PhenoMeNal participated in launch meeting of i~HD. Dipak Kalra now part of PhenoMeNal clinical user group	dipak.kalra@eurorec.org
<b>European Grid Infrastructure</b>	Tiziana Ferrari	PhenoMeNal presented at EGI Barcelona meeting. EGI staff joined PhenoMeNal discussions afterwards. Former EGI director Steven Newhouse part of PhenoMeNal.	tiziana.ferrari@egi.eu
<b>European Open Science Cloud for Research</b>	Barend Mons	Former chairman of EOSC high level expert group is member of PhenoMeNal SAB	barend.mons@dtls.nl
<b>eTRIKS</b> <sup>71</sup>	Professor Yike Guo, Imperial College London, Data Science Institute,	Chief Technology Officer of the i2b2/transMART foundation eTRIKS WP2	y.guo@imperial.ac.uk

<sup>70</sup> <https://www.indigo-datacloud.eu>

<sup>71</sup> <https://www.etriks.org>



		Leader	
<b>West-Life</b>	Sameer Velankar	Meetings to identify synergies between the projects	<b>sameer@ebi.ac.uk</b>
<b>THOR</b>		The EMBL-EBI ORCID Hub allows MetaboLights' submitters to authenticate their login using their ORCID ID.	
<b>EUDAT</b>	Giovanni Morelli	Presentation of EUDAT activities and opportunities	<b>g.morelli@cineca.it</b>
<b>OpenMinTed</b>	Jiankang Chang	Text mining and ontology	<b>jkchang@ebi.ac.uk</b>
<b>RDA</b>		Metabolomics Data Interoperability Interest Group was retired	
<b>NIH Common Funds</b>	Philip Smith, NIH	Leaders of PhenoMeNal helped sharing Common Funds Metabolomics programme	SmithP@extra.niddk.nih.gov
<b>Massbank</b>	Masanori Arita		
<b>Human Metabolome Database</b>	David Wishart		
<b>Beijing Institute Genomics</b>	Peter Li	Workshop in December 2016 at EMBL-EBI: worked on data standards and tools	peter@gigasciencejournal.com



		embedded in PhenoMeNal	
<b>Galaxy Community</b>	Bjoern Grunning, Enis Afgane	Interactions to transfer ownership of most of our Galaxy deployment logic (helm, kubernetes, container) to the Galaxy community. Interest from the community in sharing development. Multiple hangouts and meetings.	





## Update on missing international e-infrastructures

<b>Infrastructure Name</b>	<b>Short description</b>	<b>Type</b>	<b>Reference (e.g. Web or elsewhere)</b>
EDISON	Definition of skills and roles from Data Steward to Data Scientist	H2020 project	<a href="http://edison-project.eu/">http://edison-project.eu/</a>



## New country reports (not included in the M6 report):


### Greece

Note: The following infrastructures have been included in the Greek National RoadMap and are under final review expected to be funded starting from 09/2017. EATRIS-GR (with the asterisk) has passed the first round of reviews and is to be included in the Greek National RoadMap by the end of the year; Mikrobiokosmos is mainly a scientific society which integrates many partners from different disciplines

Infrastructure Name	Short description	Type	Reference (e.g. Web or elsewhere)	Contact person
ELIXIR-GR	The Greek node of ELIXIR-Europe	National	<a href="https://www.espa.gr/el/Pages/ProclamationsFS.aspx?item=3120">https://www.espa.gr/el/Pages/ProclamationsFS.aspx?item=3120</a> ; <a href="http://www.gsrt.gr/News/Files/News11267/List20RIs-1stbatch.pdf">http://www.gsrt.gr/News/Files/News11267/List20RIs-1stbatch.pdf</a> (in Greek – they show the list of 20 Greek research infrastructures that have been included in the Greek national roadmap)	Babis Savvakis (HoN) - Martin Rezcko (Technical Coordinator)- BSRC Alexander Fleming  Maria Klapa FORTH/ICE-HT, coordinator of the computational metabolomics and protein interactomics use-caSe



<p>INSPIRED (including INSTRUCT-EL)</p>	<p>The National Research Infrastructures on Integrated Structural Biology, Drug Screening Efforts and Drug target functional characterization (INSPIRED)</p>	<p>National</p>	<p><a href="https://www.espa.gr/el/Pages/ProclamationsFS.aspx?item=3120">https://www.espa.gr/el/Pages/ProclamationsFS.aspx?item=3120</a> ; <a href="http://www.gsrt.gr/News/Files/News11267/List20RIs-1stbatch.pdf">http://www.gsrt.gr/News/Files/News11267/List20RIs-1stbatch.pdf</a> (in Greek – they show the list of 20 Greek research infrastructures that have been included in the Greek national roadmap)</p>	<p>Evangelia Chrysinas (contact person for INSTRUCT-EL), NHRF, Athens  George Spyroulias (coordinator of the Western Greece section), U. of Patras</p>
<p>Mikrobiokosmos</p>	<p>Hellenic Initiative for Microbial Research with diverse applications</p>	<p>Scientific/Research Society – organizing conferences – potentially collaborating in national and European grants</p>	<p><a href="http://www.mikrobiokosmos.org">http://www.mikrobiokosmos.org</a></p>	<p>Christos Ouzounis CERTH</p>
<p>EATRIS-GR</p>	<p>Greek node of EATRIS-Europe (currently observer)</p>	<p>National</p>	<p>Proposal accepted to be included in the National RoadMap in a subsequent stage starting by the end of 2017 – the infrastructure in Greece is mainly focused on drug toxicology and Clinical Phase I studies</p>	<p>Paschalis Sideras, BFRAA</p>

Who do we target	What do we want to achieve	Who takes action	What are we going to do? 
<b>Potential champions / ambassadors</b>			
Note: Greece has currently no member in the Phenomenal Consortium – there are laboratories that are active in computational metabolomics research and participate to the use-case of ELIXIR-GR with relevant tools (shown in the potential contributors' section)			
Need to grow from the potential users listed below			
<b>Potential users (academic and industrial) of PhenoMeNal</b>			
Note: Mainly laboratories who are active or are getting active in experimental NMR or MS-based metabolomics research - below added some major research laboratories of metabolomics research in Greece			
<b>George Theodoridis</b> , Dept. of Chemistry, University of Thessaloniki	Standardized repositories, Streamlining MS-based metabolomics research and applications	Phenomenal Members involved in understanding user needs, in training	Connect needs to tools, direct to proper training, understanding needs for tool improvement
<b>Emmanuel Mikros</b> , Department of Pharmaceutics, University of Athens  <b>Leandros Skaltsounis</b> (coordinator of the same laboratory)	Standardized repositories, Streamlining NMR-based metabolomics research and applications  Major laboratory in Greece and Europe for natural products research – collaboration with relevant companies	Phenomenal Members involved in understanding user needs, in training  Apart from the above, phenomenal members that are involved in the development of tools for specialized application needs	Connect needs to tools, direct to proper training, understanding needs for tool improvement



<b>Maria Klapa</b> FORTH/ICE-HT	Standardized repositories, Streamlining MS-based metabolomics research and applications	Phenomenal Members involved in setting up cloud computing, standardized procedures/tools, training	Harmonize procedures and repositories between labs and countries
<b>George Spyroulias,</b> Department of Pharmaceutics University of Patras	Standardized repositories, Streamlining NMR-based metabolomics research and applications	Phenomenal Members involved in understanding user needs, in training	Connect needs to tools, direct to proper training, understanding needs for tool improvement
<b>George Kotoulas,</b> Institute of Marine Biology, Biotechnology and Aquaculture, Greece	Integrated omic analyses for fish –related studies (use-case in ELIXIR-GR)	Phenomenal Members involved in understanding user needs, harmonizing data collection methods and repositories, in training	Connect needs to tools, direct to proper training, understanding needs for tool improvement
<p><b>Potential contributors (instrument vendors or others)</b></p> <p>(Note: here listed mainly research groups in Greece who are developing computational tools for metabolomics, metabolic network/flux analysis, integrated metabolomics and protein interactomics – they participate in the computational metabolomics use-case of ELIXIR-GR (mentioned above).</p>			
Aristotelis Chatziioannou, NHRF	Development of tools for metabolic and signaling network analysis	To be connected with Phenomenal members who are leading the section in analytical tools development	



<p>Martin Rezcko, BSRC Alexander Fleming</p>	<p>Development of tool for bacterial metabolic network analysis</p>	<p>To be connected with Phenomenal members who are leading the section in analytical tools development – streamlining infrastructures across countries (as Technical Coordinator of ELIXIR-GR)</p>	
<p>Maria Klapa</p>	<p>Development of integrated software platform for streamlining GC-MS based metabolomics (standardized MS peak library, standardized repository, specialized normalization tool for GC-MS metabolomic data, method for GC-MS unknown peak identification) – M-IOLITE</p>	<p>Tool has been approved to be funded for further development and curation from ELIXIR-GR (evaluated by a Scientific Advisory Committee of international experts) – need to be integrated with other relevant tools in LC-MS or NMR based metabolomics</p> <p>Can contribute to the connection of Greece to cloud resources, common repositories as coordinator of the computational metabolomics use-case in ELIXIR-GR infrastructure (along with Martin Rezcko - above)</p>	
<p><b>Relevant national (policy or funding) research infrastructure initiatives that could support the continued development of PhenoMeNal + status thereof (for instance proposal has been submitted) + parties involved + link to website of funding agency/call description</b></p>			



See first part of this table and associated notes - other potential funding sources collaborative (or individual researcher) projects to be funded by calls of General Secretariat of Research & Technology (GSRT) Greece.

*Update on champions / ambassadors, users (academic and industrial), (potential) contributors to PhenoMeNal and policy measures relevant to PhenoMeNal sustainability*

### Czech republic

<b>Infrastructure Name</b>	<b>Short description</b>	<b>Type</b>	<b>Reference Web elsewhere (e.g. or)</b>	<b>Contact person</b>
Biology Centre, Czech Academy of Sciences	Molecular Biology of Model Organisms	Research facility	www.bc.cas.cz	Petr Simek
Metabolom.cz	Laboratory of Metabolomics at Palacky University in Olomouc	Research facility	www.metabolom.cz	David.friedecky@gmail.com

<b>Key (potential) users of PhenoMeNal</b>	<b>Contact person and role</b>	<b>Contact details (email or phone)</b>
Biology Centre CAS	Petr Simek, metabolomics	simek@bclab.eu
Laboratory of Metabolomics at Palacky University in Olomouc	David Friedecký, metabolomics	David.friedecky@gmail.com



## Portugal

<b>Infrastructure Name</b>	<b>Short description</b>	<b>Type</b>	<b>Reference (e.g. Web or elsewhere)</b>	<b>Contact person</b>
iMM Lisboa – Instituto de Medicina Molecular,		Research facility	<a href="https://imm.medicina.ulisboa.pt/en/">https://imm.medicina.ulisboa.pt/en/</a>	
Champalimaud Foundation		Research facility	<a href="http://www.fchampalimaud.org/pt/">http://www.fchampalimaud.org/pt/</a>	
Centre for Neuroscience and Cell Biology,		Research facility	<a href="http://www.cnb.c.pt/default.asp?lg=1">http://www.cnb.c.pt/default.asp?lg=1</a>	

<b>Key (potential) users of PhenoMeNal</b>	<b>Contact person and role</b>	<b>Contact details (email or phone)</b>
University of Aveiro	Ana Gil	agil@ua.pt
University of Beira Interior, Covilha	Carla Cruz	carlacruz@fcsaude.ubi.pt





University of Coimbra, Faculty of Medicine	Isabel Carreira	i_marques@hotmail.com
--	-----------------	-----------------------

## Estonia

Infrastructure Name	Short description	Type	Reference (e.g. Web or elsewhere)	Contact person
Estonian Scientific Computing Infrastructure	EE national supercomputing and storage service	e-Infrastructure	<a href="http://www.etais.ee">www.etais.ee</a>	Ivar Koppel
ELIXIR Estonia - A Distributed Infrastructure for Life-Science Information	EE node to ELIXIR infrastructure	e-Infrastructure	<a href="http://elixir.ut.ee/">http://elixir.ut.ee/</a>	Jaak Vilo
Estonian e-Repository and Conservation of Collections	Integrated e-Repository for digitized resources	e-Infrastructure	<a href="https://www.e-varamu.ee/">https://www.e-varamu.ee/</a>	Andres Kollist, Martin Hallik
Estonian Centre for Genomics	Population-based biobank, EE node to BBMRI infrastructure	Research Facility and e-Infrastructure	<a href="http://www.geenivaramu.ee/en">http://www.geenivaramu.ee/en</a>	Andres Metspalu



Natural History Archives and Information Network (NATARC)	Hosting and computing of scientific repositories and data archives in natural sciences	e-Infrastructure	<a href="https://natarc.ut.ee/en/index.php">https://natarc.ut.ee/en/index.php</a>	Urmas Kõljalg
National Centre for Translational and Clinical Research	Translational medicine research facility, EE node to EATRIS infrastructure	Research Facility	<a href="http://www.ctm.ee/">http://www.ctm.ee/</a>	Sulev Kõks
The Optical Backbone Network of Estonian Research and Education	Fast information technology infrastructure for research and education, connected to GEANT	e-Infrastructure	<a href="http://www.eenet.ee/EENet/optikavork">http://www.eenet.ee/EENet/optikavork</a>	Urmas Lett