# Coordinated Research Infrastructures Building Enduring Life-science services
## - CORBEL -

Deliverable D2.4
Final Stakeholder Meeting

WP2 – Documentation, communication and outreach

Lead Beneficiary: DSMZ-German Collection of Microorganisms and Cell Cultures
WP leader: Christiane Hauk (DSMZ)
Contributing partner(s): ECRIN-ERIC, EMBL-ELIXIR

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# Content

# Executive Summary

During the final meeting, the CORBEL consortium members presented solutions for harmonising user access to the European life science research infrastructures (LS RIs). Topics covered included access, data, quality management, training, ELSI, innovation support, and more. Presentations by scientists from the biological and medical user communities illustrated how concerted access to multiple RIs advanced their projects, thus demonstrating the benefit of CORBEL for European life science research.

The one-day meeting was open to European scientists from the biological and medical field, potential users of the CORBEL common services as well as other stakeholders generally interested in CORBEL and the European life science RIs.

This document provides summaries of the presentations made at the Final AGM, including key takeaways. It also provides summaries of the discussions following the individual presentations (the question/answer periods), as well as the panel discussion. As such, the document provides minutes, while highlighting select information (main ideas, proposals for development, and so on).

# Project objectives

With this deliverable, the project has reached/this deliverable has contributed to the following objectives:

a) Development and execution of targeted user engagement and user experience activities to support opening of the services developed in the project to the wider community

b) Dissemination of project results, e.g. through publications and presentations at relevant conferences

c) Organisation of stakeholder meetings to provide ongoing opportunities for multi-way communication and feedback to the project partners

# Detailed report on the deliverable

## Background

Supporting documentation can be found on the project's Google drive[1].

## Description of Work

### Agenda

| Time | Item | Speaker |
|---|---|---|
| **1 March 2020** | | |
| **20:00** | **Australian/EU strategic partnerships dinner (Invitation only)** | |
| **2 March 2020** | | |
| **8:00** | **Registration/Coffee/Tea (1st floor)** | |
| **9:15** | • **Welcome (Plenary, 1st floor)** | • Niklas Blomberg (Coordinator CORBEL) |
| **9:30** | **For the advancement of science - Working with biomedical RIs (Chairs Frauke Leitner and Sonja Hansen)** | |
| | • **Introduction**<br>• **Revealing the morphological plasticity of a cell in planktonic symbioses**<br>• **Sharks, skeletons and spectral imaging: Exploring the hidden life of chondrocytes and tessellated cartilage** | • Frauke Leitner, Sonja Hansen<br>• Johan Decelle (EMBRC, EuBi)<br>• Mason Dean (EMBRC, EuBi) |
| **11:20** | **New frontiers in health research data (Chair Serena Battaglia)** | |
| | • **Medical RIs and research communities: the experience of MIUF**<br>• **Patient-level data sharing in clinical research**<br>• **Integrating EU-wide cardio- vascular research datasets** | • Ignacio Baanante & Hella Lichtenberg<br>• Christian Ohmann<br>• Adriano Barbosa |
| **13:00** | **Group picture, Lunch** | |

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[1] https://drive.google.com/drive/folders/19aW47wRC-fBLDODObccqglQXyMvf9IvJ

| 14:00 | **Developing people, services and facilities: Supporting life science RIs (CORBEL Highlights and panel discussion on opportunities) (Chair Antje Keppler)** | |
|---|---|---|
| | • **ARIA: harmonising access to research infrastructures (WP5)**<br>• **Quality management in research infrastructures - opportunities, challenges and impact (WP5)**<br>• **Competency-based training (WP9 - Vera)**<br>• **'Translational medicine advice given under CORBEL' / 'Innovation assistance and industry interaction' (WP8)** | • Natalie Haley<br>• Michael Raess<br>• Vera Matser<br>• Nigel Wagstaff |
| 15:15 | **Managing, integrating and reusing data across life science RIs (CORBEL highlights and panel discussion on opportunities) (Chair Jacques Demotes)** | |
| | • **ELSI aspects (WP7)**<br>• **Data management toolkit (WP6)**<br>• **Clinical metadata repository (WP3)**<br>• **Multimodal data integration  (WP3)** | • Michaela Th. Mayrhofer (per video)<br>• Carole Goble<br>• Sergei Gorianin<br>• Jan-Willem Boiten |
| 16:20 | **Coffee/Tea break** | |
| 16:35 | **Panel discussion - Future joint access - the future of research infrastructures - connecting users, science and facilities?**<br>• **Susan Daenke: Structural biology**<br>• **Nicolas Pade: Ecosystem access**<br>• **Toni Andreu: Health research**<br>• **Daria Julkowska (EJP RD), Hella Lichtenberg from PT-DLR (ERA-CVD, NEURON), Ignacio Baanante from ISCIII (ERA-PerMed, EuroNanoMed), Sarah Nisbet (Bioplatforms Australia), Josep Maria Haro Abad  (SYNCHROS)** | • Chair Niklas Blomberg |
| 17:20 | **Key note** | • Lucia Banci (CERM) |
| 18:20 | **LS RI website** | • Caitlin Ahern (BBMRI-ERIC) |
| 18:25 | **Wrap-Up** | |
| 18:45 - 21:45 | **Final MIUF meeting (including working dinner) (26th floor)** | |

## Discussion Summary and Key Findings

Cutting edge life science research in Europe is carried out by scientists funded nationally, through European coordination programmes (JPI, ERA-NET), and through large public-private partnerships such as IMI. To be truly transformative the life science research infrastructures need to effectively interface with the scientists and projects within these large and diverse user communities as well as the bodies responsible for organising the funding calls.

An important conclusion from the presentation from the user-projects funded through CORBEL and the open discussion was that the cross-RI pipelines have been very effective tools in opening up RI services to new user communities; several projects stated that they would not had discovered and accessed services without the interdisciplinary CORBEL calls. A second important conclusion was the need for central RI support to simplify project management and help the users to access the advanced facilities across disciplines. CORBEL has provided added value in promoting access to services, tools, and/or expertise that would otherwise not be available to researchers at their local institutions. It has also demonstrated the importance of – and provided – use cases that illustrate how RI can open up research projects to new experiments. We need to find access models that helps research projects to take risks and experiment together with the advanced facilities. Thus, projects like CORBEL), help show funders and other stakeholders (e.g. members, partners, etc.) how the use of RIs makes research better.

The importance, and challenge, to link research infrastructures with national and international funding instruments was also highlighted in the open stakeholder debate from the MIUF taskforce where it was observed that the lacking national strategies for how domestic projects should make best use of the research infrastructures – supported from national roadmaps – leads to missed opportunities. There is a need to promote the use of RIs at national level and member states have a key role to play here. It was noted that small changes to programmes – e.g. better models for access costs or travel to remote facilities – could make significant difference. Additionally, research infrastructures need enhance the communication, and clearly explain what we are, what we do, and the services that we can offer. Projects such as RI-VIS and ERIC Forum are important in this regard. Additionally the MIUF can be taken forward to support emerging European initiatives such as 1+ Million Genomes.

CORBEL has delivered a set of common services and policies for data, innovation and user access that will underpin the interconnection of the life science RI. These services, e.g. the join login service (Life Science AAI) and user access tool (ARIA) will be taken forward through EOSC-Life. Additionally, life science RIs have now developed bilateral or multilateral partnerships based on the CORBEL pathways that will continue to serve users. Much of CORBEL's data work will be continued through EOSC-Life, which will address the various data-sharing issues initiated through the project. A particular challenge for the RI is to provide solutions for the acquisition and analysis of multi-modal data in projects – this often needs tailor-made solutions.

## Item 1: Welcome

**Speaker:  Niklas Blomberg (ELIXIR - Coordinator CORBEL)**

**Remarks:**

- CORBEL project has managed to give users access to services without having to go through multiple rounds of interfacing
- CORBEL legacy: the fact that you can do advanced science without having to have well-equipped facilities (at your home institution). That remote access is really important, as it allows people to stay at their home universities without moving. It is really important role for us, as research infrastructures (RIs) to spread that [scientific] excellence across Europe.
    - o CORBEL has enabled access, democratisation, and harmonisation across facilities in Europe
- Project includes all 13 Biological and Medical Sciences Research Infrastructures (BMR RIs) on ESFRI Roadmap; ERINHA and EMPHASIS joined during the course of project. As of March 2020, there are 38 partners in 13 BMS RIs.
- CORBEL was initially a 4-year project, has been extended to allow user projects to finish. Budget: 14.8 million euros
- CORBEL builds on the outcomes from the previous joint life science RI cluster project "BioMedBridges". BioMedBridges[2] focused on data whereas CORBEL broadened to scope to consider the interoperability of RI user access, data, innovation and quality management
- CORBEL project structure: really driven by 2 large work packages, focused on medical and biological research respectively
- Today's agenda: start by hearing the outcomes of the biological/medical use cases. Afternoon: more technical achievements

## Item 2: For the advancement of science - working with biomedical RIs (Chairs: Frauke Leitner and Sonja Hansen)

**Introduction** (Frauke Leitner and Sonja Hansen, Euro-BioImaging and ISBE):

**Remarks:**

- Purpose of this session is to give the floor to the users, let them share what they have achieved
- CORBEL mission: harmonise access and services across RIs and across cutting-edge technology platforms to support modern and pioneering research. Access is just one component: you also need to know how to use the equipment (so you need the experts). Operating projects with all those components together is quite a challenge.
- WP4: Objective: pilot the provision of 'open user access' across RIs
- **Step 1: VIP projects**
    - o Build on pre-existing RI user contacts
    - o Quickly establish joint access procedures

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[2] BioMedBridges was a joint effort of twelve BMS RIs on the ESFRI roadmap. Together, the project partners developed the shared e-infrastructure—the technical bridges—to allow data integration in the biological, medical, translational and clinical domains and thus strengthen biomedical resources in Europe. The project successfully concluded in December 2015, delivering the basis and impetus for its follow-on sister project CORBEL. (Source: http://www.biomedbridges.eu/)

- **Step 2: 1st Open Call**
  - o Public advertisement (of CORBEL support services) to European research community
  - o High publicity and visibility for life science RIs
- **Step 3: 2nd Open Call (following success of 1st call)**
  - o Incorporated user and service provider feedback
  - o Improved processes, communication, selection criteria
  - o Widened service portfolio by linking to medical RIs
- Open Call offered access to cutting-edge technologies and services at more than 20 service providers from 10 European RIs
- Projects that made it through selection process received and still receive constant support through project managers
- CORBEL funds are used to cover requested access and travel grants for users
- Users are both from industry and academia
- **Applicant profiles:**
  - o University: 70%
  - o Public research organisations: 22%
  - o SME: 6%
  - o Other: 2%
  - o Gender balance: 34% women, 66% men
- 37 projects passed evaluation process; 53 applications in all
- Scientists build their own pipelines between RIs
- What is needed to drive these projects? Good communication – ability to advise users where to turn for support. So one activity they did was to organize several workshops to drive interaction between service providers and users, introduce users to new technologies, help them with networking

**'Benefits for Users and Service Providers':**

- Users were asked how RI services were useful to them, and their main response was the access to technologies not available locally, as well as access to highly skilled technical expertise
- **Users' benefits:**
  - o Access to otherwise inaccessible technical/skilled expertise
  - o Financial support to conduct project
  - o Producing high-quality data for their research
  - o Establishing long-term collaborations
  - o Improving skill set and technology know-how
- **Service provider benefits:**
  - o Building bridges between life-science communities
  - o Working on new challenges can push their systems to new frontiers
  - o Increasing their visibility, etc.
- User testimonials: (select information, see slides in the "Final AGM" meeting folder)
  - o Access to RIs with experience not present in our laboratory, filled a gap, thus improving research
  - o Makes process faster and simpler

- Possibility to obtain huge amount of results and scientific information in an extremely short timeframe
- What now? (After CORBEL ends)
  - Increased interaction and collaboration between BMS RIs
  - Shaping cross-RI service provision
  - Driving creation of scientific results, publications in preparation
  - Deeper knowledge of purpose of other RIs
  - Increased visibility of RI services
  - Bilateral Collaboration Agreements to support common access: first ones signed, more to come!

**Talk: Revealing the morphological plasticity of a cell in planktonic symbioses (use case)**

**Speaker: Johan Decelle (CNRS, Univ. Grenoble)**

**Remarks:**

- Phytoplankton are very important, photosymbiosis is widespread in the ocean, very interesting strategies in terms of life stages. Some plankton can live inside host cells …
- Abundant and widely distributed in oceans, contribute to the carbon cycle (so to climate mitigation). Despite this key ecological role, we know very little about these organisms, and how this interaction works (between two cells).
- Diversity of photosymbiosis in the oceanic plankton: wide diversity of hosts and microalgae
- Host cell can be associated with thousands of photosynthetic cells
- What's interesting in this project: those organisms are 'not in culture', so we need to sample them in the ocean. **So CORBEL support for this project was key**.
- **Research questions:**
  - How does a heterotrophic cell take control and exploit a microalga?
  - We need subcellular imaging to study cellular interactions → unveils the cellular architecture of the microalga
- Thanks to CORBEL project, they were able to sample planktonic symbioses in the Mediterranean Sea (access provided by EMBRC member: CNRS Marine Observatory of Villefranche-sur-Mer)
- What they did: isolated the symbiotic cells, then went back to Grenoble; used cryo-fixation (at very high pressure). Then used advanced microscopy at EMBL (to observe cells at nano-scale level and in 3D)
- What they observed: morphological transformation of the microalga in symbiosis; cell division is blocked inside the host cell.
- Advantage of this technique: not just images; found that volume of chloroplast much bigger than in previous stage. With special resolution, we can enter into the chloroplast and better understand the topology of membranes…
- Host transforms the microalga cell into a very powerful cell
- (Workshop will be held from 27-29 May 2020 to explain how to prepare samples and analyse with such microscopic techniques)

**Q&A** (select remarks):

Q. Where would you be with this project without CORBEL and the European RIs?

A. Accessing the microscoping instrument, very important. And it's very difficult to operate; without the help of EMBL it would have been very difficult. So now we produce lots of data that we are still analysing, and will prepare some manuscripts from this.

Q. How can we spread the word that these services exist to the larger scientific community?

A. Workshop is a nice opportunity

Q. Do you see opportunities for research funding rather than relying on the research infrastructure to support your research?

A. We have now been contacted by other research groups. Now many people are interested in applying these techniques. The RI can gain visibility, and address new research questions.

**Talk: Sharks, skeletons and spectral imaging: Exploring the hidden life of chondrocytes and tessellated cartilage (use case)**

**Speakers: Mason Dean, Júlia Chaumel and Maria Marsal (MPIKG, ICFO)**

**Remarks:**

- Trying to link concepts from the biological world to the natural world; look at feedback loops
- Nature plays with very few material types; just combines them in interesting ways, so gives us a nice palette to see how nature deals with form/composition
- Department of biomaterials: people working on a wide range of topics, from sensory biomaterials to water biomolecule interaction
- Cartilage: looking at its structure in its native state is very complicated
- Research focus: sharks and rays, because they are doing 'crazy things' with cartilaginous skeletons. They do forceful biting, suction feeding, ballistic jaw protrusion with cartilage
- EURO-BioImaging provided services: they have microscopes and make custom-made microscopes based on user needs
- There was a need to interpret the auto-fluorescence images; working with lab for this purpose
- In the process, discovering a few things: found some cartilage canals, which are not supposed to be there. No cartilage canals in adult mammals. But in sting rays, you have the canals, even in adults.
- **Wrap-up, what we've learned:**
    - o Fluorochromes can be used to study skeletal growth
    - o Auto-fluorescence is annoying
    - o Label-free imaging is a powerful tool for less-accessible tissues
    - o Cartilage canals disappear with age (etc., see slides)
    - o **Wouldn't have been able to do this in our home institutions**

**Q&A** (select remarks):

Q. What can RIs like EMBRC do to help you?

A. One of the challenges we ran into was just getting the animals. Through an aquarium we got access to the animals, and they were reluctant to give them to us. It's a huge thing to care for the animals (feed them, check water quality, etc.). Figuring out some way to 'grease the wheels' to get the samples in the first place is extremely helpful.

## Item 3: New frontiers in health research data (Chair: Serena Battaglia)

**Introduction (Serena Battaglia, ECRIN)**

**Remarks:**

- Started a discussion with different stakeholders (medical research communities and pan-European funding programmes) to strengthen collaboration between all the actors, making sure to capture users' needs and develop tailored services across disciplines and RIs. Today would like to show you some of the achievements

**Talk: Medical RIs and research communities: the experience of MIUF**

**Speakers: Ignacio Baanante & Hella Lichtenberg (ISCIII, PT-DLR)**

**Remarks (Ignacio Baanante, ISCIII):**

- Was asked to answer: What kind of activities are you implementing or plan to implement to work with RIs? And, as a funding organisation in the context of ERA-Nets (but not only) and in relation to research communities?
- Task: action plan for use of infrastructures and tools, extension of current infrastructures to include a defined section on AMR (antimicrobial resistance)
- JPI on degenerative diseases: there are some activities (innovative strategies for alignment of infrastructures and tools)
- TRANSCAN3 (translational research in cancer)-Task: strategy on networking with EU and international stakeholders involved in cancer research and care
- Measures in joint transnational calls:
  - o Use of RIs is encouraged; list/links of RIs are provided in guidelines for applicants; dissemination of calls through RIs; search tool, etc.
- **Conclusion/main messages:** these measures are not enough; bottom-up approach not enough; lack of knowledge of RIs at all levels (funders, scientific community); responsibility of ERIC member countries
- *Additional notes on this point:* in many countries, people organising the call are unaware of European RIs; you have to be proactive to know what RIs are offering in terms of services. His opinion: responsibility of countries – now that they are dues-paying members, they should play the role of promoting the use of the RI

**Remarks (Hella Lichtenberg, PT-DLR):**

- EBRA (European Brain Research Area): a very recent CSA (Coordination and Support Action – 'coordinating brain research and developing global initiatives'). 4 partners: European Brain Council, Human Brain Project, JPND, ERA-Net NERON
- Run-time: Nov. 2018 to Oct. 2021
- EBRA: 5 WPs
  - o WP1: management

- o WP2: analyse research portfolio and identify projects to call together in active clusters
- o WP3: shared Euro Brain research agenda and global initiatives
- o WP4: accelerate excellence, innovation and translation, and foster exchange by promoting open science – most important task for CORBEL
- o WP5: patient involvement/dissemination
- Disappointing involvement (to link to European RIs)
- Planned collaboration with MIUF: EBRA and CORBEL will organize F2F workshops dedicated to the active clusters/institutional multipliers to highlight tools and services available and to foster the development of use cases

**Q&A:**

Comments:

Q. Niklas Blomberg: First time I have heard clear statement that there should be national strategies to use the infrastructures – this is really important! Researchers need to understand what the services are in the RIs. This morning, 2 interesting talks: new areas opened up for RI services. So maybe the question is, How to have more of these exemplar projects? Could we link that to national strategies?

A. Knowledge is scarce in scientific community. As a funder, if someone asks, we can say, here are the RIs, here is the catalogue, but we cannot tell them which one they might need. Intrinsically, the word 'service' means "cost". And ERA-Net projects are not over-funded.

- Susan Daenke (Instruct): agrees that getting the members to develop a strategy is an essential part, and has never heard this suggested before. Maybe one of the reasons is that the members might not understand the value of the RIs properly. Our infrastructure (structural biology) has been asked, how much research could not have been done without your RI? It's the wrong question, it should be, how did your RI make the research better? Might make it faster, might make data set richer, might enable new capabilities. In order to do this, we need great examples of high-impact science that has used the RIs. Researchers will understand these use cases, so that's the way to do it.
- Comment (Lorenza Saracco, European Commission): true that until beginning of Horizon 2020, most RIs were under development, and unable to provide services. Now they are. Indeed we need to do more. The Commission, for Horizon Europe, is thinking of making RIs more visible. Sometimes: member states do a lot of work to be part of the RI, then they think the work is over. But then they need to push to promote the RI.
- Christian Ohmann, from ECRIN side: we did an external evaluation (external board), have formed a task force to assess the impact of ECRIN.
- Following up: Jacques Demotes, director general of ECRIN: need to do an evaluation every 5$^{th}$ year [as an ERIC], important to have it done by an independent body (not the scientific advisory board). This is a good way to understand best ways to improve the organisation and cost-effectiveness.
- Niklas Blomberg: if you look at CORBEL, the 2 projects we saw this morning were 'high-risk endeavours'. Science was largely untested, the researchers had not established the methods with the facilities in previous projects, not really any strong precedence – i.e. innovative. So

something to discuss, how to find ways to enable access to these consortia to try out new methods with the RI facilities? I would imagine that for the 2 projects from this morning, you would hesitate to bring the facility in as part of the grant proposal as the science was untested. We need to find models that encourage experimentation and risk-taking to help broaden user base. In this sense CORBEL has provided a very useful example.

- Jacques Demotes: RIs are instruments to support research; ERA-Net is a funding instrument. The two could work perfectly together (this will be the topic of the ERIC Forum meeting, Sept or Oct 2020). One of the most challenging topics is open science. In CORBEL we have started work to prepare the 'community' for clinical data sharing

**Talk: Patient-level data sharing in clinical research: a long story**

**Speaker: Christian Ohmann (ECRIN)**

**Remarks:**

- Starting point, look at concerns (Q.  What problems/concerns do you have with sharing datasets?)
    - o  Concerns about misuse of data
    - o  Unsure about copyright and licensing
    - o  Not receiving appropriate credit or acknowledgement
    - o  Unsure I have the rights to share
    - o  Organising data, etc.
- (Principles/recommendations: see slide)
- If we look at data sharing, there are powerful examples that show the benefit of data sharing in this area
- Pushing hard in EOSC-Life to get the workflow of the data models and the whole environment
- Evaluated and assessed repositories, and ended with 25 in a comparative analysis. Many of them do not fulfil basic quality criteria at this stage.
- Scoping review: status of sharing of individual participant data from clinical trials, use of shared data and impact of research outputs of sharing data: a scoping review protocol
- Data challenges: data should become first-class research product: Validated, preserved, cited, credited
- Summary: we think what is necessary is to develop a user-friendly data sharing toolbox, providing tools/services integrated into the data sharing workflow.

Other needs:

- Training of researchers
- Need to improve platforms/repositories
- Need to work on certification of repositories, need to take into consideration business models
- Big problem we are starting to tackle: fragmentation
- We need these methods to demonstrate that data-sharing has a benefit
- Very important for data-sharing, the F in FAIR, working on this in XDC by developing a metadata repository (Sergei to report in the afternoon)

**Q&A:**

Q. Question raised regarding collaboration with industry

A. Response (to this and other questions): tendency for some repositories to become the leader in this business. But Christian thinks there will always be disease-specific repositories, and we cannot change the situation. We can come to a quality/certification framework, and say that only if these criteria are respected, this is an acceptable repository. Federating repositories is very difficult.

**Talk: Integrating EU-wide cardio-vascular research datasets**

**Speaker: Adriano Barbosa da Silva (QMUL)**

**Remarks:**

- Introductory remark (by Serena): Talk is related to a practical case: project on Integration of EU-wide cardiovascular datasets
- Adriano has been working at Queen Mary U. of London as part of CORBEL.
- 4 RIs involved in project: BBMRI, EATRIS (plus Lygature), ECRIN and EuBI
- Idea is to bring together imaging data from across Europe; tranSMART addresses issue of how to share data. What they do: they use open-source software (to integrate isolated data sets scattered in different silos)
- CORBEL: a way to put different pieces together, and think about a bigger picture for your data project. So CORBEL let him collect datasets sitting in different hospitals; enabled him to store images; analyse, and integrate (stratification was executed at Queen Mary)
- Presentation of what each RI did:
    Q. **BBMRI:** Added QMUL as a registered institution; helped to create a descriptive query; increased query limits from 100 to 500+ biobanks at once, etc.
    R. **EATRIS:** Contacted relevant partners at hospitals with compatible data; needed help with data processing agreements (DPAs). Result of their help: 2 negotiations, collaboration possible with ISMETT, DPA almost ready; same thing with St. Anne's U. Hospital in Brno (Czech Republic) – they needed an MoU to start scientific collaboration, and afterwards, set up DPA. Lygature (EATRIS): Rita Azevedo helped a lot with translational issues.
    S. At Queen Mary: applied machine learning methods to stratify cardiovascular patients based on machine learning
    T. (See slides for additional support from participating RIs)
- Overall evaluation and feedback: What did we appreciate? Quick 'VIP treatment' and support. How to improve? Be very specific about what you need. We need to continue this business model to allow individual researchers to access these infrastructures.

## Item 4: Developing people, services and facilities: Supporting Life Science RIs (CORBEL Highlights and panel discussion on opportunities) (Chair: Antje Keppler)

**Talk: ARIA: harmonising access to research infrastructures (WP5)**

**Speaker: Natalie Haley (Instruct)**

**Remarks:**

- Research infrastructures: defined as organisations that enable research communities to use specific facilities, resources and services…
- Survey done early 2015
- Managing proposal submission: the old-fashioned way
    - Insecure, prone to error, lots of manual steps, not scalable if you have a lot of applications
    - ARIA can overcome all of these issues
    - ARIA was developed by Instruct, but through CORBEL, it has been made usable for other RIs
- ARIA for peer review: simple one-page interface
- Since the 1st open call: improved messaging integrated with email. One comment that came up time over time: they would prefer to send email, not messaging through ARIA. Now people get an email and all history can be stored somewhere centrally.
- **Main message here: CORBEL has really enabled us to understand the needs (of RIs)**

**Talk: Quality management in research infrastructures - opportunities, challenges and impact (WP5)**

**Speaker: Michael Raess (INFRAFRONTIER)**

**Remarks:**

- Why quality management (QM)? It helps to deliver consistent results, meet user expectations, meet regulatory requirements, retain organisational knowledge
- In the research environment: underpins reliability and reproducibility of scientific outcomes
- What's built into QM systems: Plan, do check, act
- Challenges: quality in distributed RIs (given their structure), funding, time/resource investment
    - Quality in distributed RIs: usually you have a central hub, and nodes in different countries. You may have different legislations, nodes may have different services. Some nodes may or may not have introduced quality measures.
    - High up-front investment: approx. 1 FTE for 1 year to implement; requires input from all functional units; lots of paperwork; all employees need to be trained; costs for certification, audits, etc.
    - You need resources for implementing, maintaining; in a distributed RI, you need resources for maintaining a QM network across the 'nodes' (in the end you need a common understanding of what a QMS in your RI looks like); may be a challenge if quality is only considered an 'operational' or 'add-on' activity (impact of QM needs to be demonstrated to funders)
- Which system fits best? There are different systems out there…

- **Conclusion:** QM contributes to an RI's sustainability, requires a considerable upfront investment; added cost (to implement in national nodes); need buy-in from RI's top management. Quality management in RIs contributes to high-quality research, increases impact; buy-in from funders is required

**Talk: Competency-based training (WP9)**

**Speaker: Vera Matser (EMBL-EBI)**

**Remarks:**

- There were 4 distinct phases to CORBEL training work:
  1. Fact-finding mission: defined competencies; CORBEL looked at the technical operators
  2. Mapping of existing training: wanted to see what's out there, and what gaps we could fill
  3. Developing and delivering training to fill those gaps
  4. Sustainable delivery (plan)
- What was done? Initial survey sent out to 'the community'
- Phase 2: mapped over 400 courses

**Talk: Translational medicine advice given under CORBEL / Innovation assistance and industry interaction (WP8)**

**Speaker: Nigel Wagstaff (EATRIS)**

**Remarks:**

- On the CORBEL website, template agreements and guidelines are available for:
  o Confidentiality
  o Material transfer
  o Research collaboration
  o Data transfer
- 422 downloads in period from April 2016 to Dec 2019 → shows that people are valuing and using the templates there
- Requests from Help Desk: steady, but modest. About 40 projects from the start
- The sheer scope of RIs is daunting to SMEs; larger companies can take a more relaxed, long-term view. Through the Open Call, we reached out to industry, and they will likely come back to us – and we need to be prepared to be ambassadors.
- Sustainability:
  o RI wishes have been 'inventarised'
  o Extension of most of innovation help desk services, subject to funding arrangements

Nigel's 2nd talk:

- Help Desk advice on regulatory matters relevant for product development
- Scope: basically we're talking about the best regulatory pipeline to exploit something

## Item 5: Managing, Integrating and Reusing Data across Life Science RIs (CORBEL Highlights and panel discussion on opportunities) (Chair: Jacques Demotes)

**Talk: ELSI aspects (WP7)**

**Speaker: Michaela Th. Mayrhofer (BBMRI - by video)**

**Remarks:**

- Sustainable ELSI service
- Recorded webinar is available[3]

**Q&A:**

- Comment from Jacques Demotes: we will discuss conditions on which we can re-use health data, health records (GDPR compliance), data from national databases, prescription databases, etc. (will be addressed later today).

**Talk: WP6: Data access, management and integration**

**Speaker: Carol Goble (UNIMAN)**

**Remarks:**

- WP6 goals
- Identifiers: how do we manage them; what are the best practices, services
- Ontologies: compliant web and programmatic based access; validated data-ontology maps
- AAI: access, federated authentication and access
- Key co-operations and legacy impact: FAIR guiding principles, CORBEL is all about implementing FAIR principles
- Year 1: identifier best practice and checklists
- Year 2: semantic infrastructure and ontologies (see slides)
- Task 6.1: checklist based framework for systematic documentation, gap analysis, recs and actions developed through 6 case studies
  - 25k views of article on PLoS
  - Did joint work with the US – harmonisation with USA CDL name2thing (n2t.net) resolution service
- Task 6.2: mapping across infrastructures
- Task 6.3: secure access to sensitive data
- Federated authentication and access solution to data service providers selected by the project who support BMR RI data management…
- Where's all this going? To EOSC-Life! Identifier best practice and checklists, semantic infra and ontologies, secure data access technology, and pan-infrastructure deployment/enhancement part of EOSC-Life
- Conclusions: supported various open projects; very active in helping people with standards and implementations, particular in Elixir, BBMRI, Euro-BioImaging, EMBRC, ISBE – and better understanding of issues

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[3] https://attendee.gotowebinar.com/recording/2560935609690859266

- Many components have been taken forward, part of the technology step of EOSC-Life, but challenges (including people resources). How do you do that knowledge transfer?

## Talk: Clinical trial metadata repository (WP3)

## Speaker: Sergei Gorianin (ECRIN)

## Remarks:

- Findable (from F in FAIR): the worst applied principle here, we focus on it and try to solve it. Why such a big problem?
- Summary of problems: clinical data objects are scattered in different places, plenty of data sources, un-standardised data, unlinked data, etc.
- For researchers, would be great to have all necessary information in one place. Imagine a Google engine just for clinical trials. Trying to solve this with the MDR (metadata repository).
- Why? To maximize the discoverability of all these data objects, it's necessary to collect the metadata about them.
- What do we mean by metadata? Researcher names, study protocol, etc.; so far no agreed discovery metadata implemented and used for discovery
- Implementation: current MDR is implemented as part of H2020 XDC project. Working with ONEDATA team (Poland), and an Italian partner (INFN). So far, metadata collected from 4 sources (PubMed, CT.gov, BioLINCC, Yoda)
- Current progress: in addition to having data from 4 sources, single and universal metadata schema was developed
- Next steps: refine current metadata model to increase usefulness to users, and further investigate alignment with other approaches, e.g. data tags

## Talk: Multimodal data integration (WP3)

## Speaker: Jan-Willem Boiten (Lygature)

## Remarks:

- Many data types (multi-modal), but usually spread out (so multi-site), makes these projects quite complicated. Ideal metaphor: we need an App store for these types of projects (preferably open-source apps)
- Overview of use cases:
  o Cancer Core Europe
  o Osteoarthritis
- TransMART: hypothesis-free browsing of clinical and genomics data. Essentially allows researchers to play with biomedical data. In the course of the project, it became clear that tranSMART has limitations. Decided to include cBioPortal
- Last deliverable, delivered last month
- You see that this world is changing all the time; **do not try to aim for a monolithic, one-size-fits-all solution**
- Access control is always an issue with open-source tools

- Data experts should be deeply involved in data harmonisation from the start; harmonisation efforts should never be underestimated and should be avoided whenever possible ("FAIR by design"); ethical/legal prerequisites require careful planning

**Q&A:**

- Jan-Willem sees possibility to break down tranSMART into smaller components; now, a bit concerned about its future

## Item 6: Panel discussion (Chair: Niklas Blomberg)

**Participants:**

- Susan Daenke (Instruct): Structural biology
- Nicolas Pade (EMBRC): Ecosystem access
- Toni Andreu (EATRIS): Health research
- Daria Julkowska (EJP-RD)
- Hella Lichtenberg from PT-DLR (ERA-CVD, NEURON)
- Ignacio Baanante from ISCIII (ERA-PerMed, EuroNanoMed)
- Sarah Nisbet (Bioplatforms Australia)
- Josep Maria Haro Abad (SYNCHROS)

**Moderator**

Niklas Blomberg (ELIXIR)

**Purpose:**

The core objective of CORBEL has been to increase the ability of Europe's life science infrastructures to collectively serve users - both individual scientists and large European projects. The purpose of the panel is to discuss the experiences of CORBEL, both from the perspective of research infrastructures and users and point towards the future with ideas on how to better connect users, scientific projects and infrastructure facilities.

**Moderator kicks off with question:**

*For Sarah N: International perspective*

"I know you have followed European research infrastructure development for a number of years now - could you perhaps compare and contrast with the development of BioPlatforms AU - what has impressed you? What could we learn?"

**Her reply:**

FAIR data; holistic view of infrastructure; in Australia, now it's about communities. Australia can learn from the maturity of Europe/Elixir, your methods of engagement with the other RIs, the workshops you've been running and the impact of those. A registry of all services could be helpful in Australia.

*For internal (Susan, Nicolas, Toni)*

"What would you say is the most important learning for your infrastructure from working across the infrastructures in CORBEL?" *(and general comments about the **day's findings, challenges, etc**.)*

**Nicolas Pade:** things have enormously improved. Quite difficult to get the national engagement, varies greatly from one country to another. But doors are now open. In terms of understanding what the RIs do, that's a good point. What we've been writing has been to respond to funders, so we've created 'impenetrable jargon'; there is a project, RI-VIS, addressing this point. Working with other infrastructures: what do we have that's complementary? How can we maintain these pipelines that were successful?

**Susan Daenke:** in terms of engaging with national RIs, quite difficult to do. RIs are pan-European, national infrastructures are funded differently. They have tried to address this by making ARIA available to national researchers. There will be opportunities for other RIs to work with us in the context of coronavirus.

**Toni Andreu:** we've been using the word 'cooperation' a lot, but we need to transform sporadic cooperation into stable cooperation. We need to find examples of how working together will multiply our capacities. We are the privileged actors who can connect the needs of these actors. Issues of communication and visibility are extremely important.

***And regarding user needs …***

**Susan:** users tell us what they need, and we try to respond to that. So we keep our RI at the forefront of development. We ask for feedback after every 'access visit'.

**Nicolas:** very much listening to what the users want. One of the useful things about the Transnational Access program, we can immediately ask if people got what they wanted out of it. Immediate evaluation. We have to juggle what we're being told by users/national nodes. If we're not providing services that the users want, we will change them; but sometimes difficult to get feedback.

Perspective from Australia (**Sarah**): may depend on the maturity of the 'users' – some may push the RI to its limits. Other researchers know the research question answered, but they don't know how, and that's our responsibility as the RI to communicate and provide that support/bias.

**Toni:** The Alliance of Medical Research Infrastructures was recently launched: we have capacities that complement each other, and it's extremely obvious here. We're considering establishing a common strategy

*For external users (Daria, Hella, Ignacio, Josep Maria)*

"You have all interfaced with the life science ESFRI RIs over the last years - through projects such as EJP RD or through the MIUF. Could you summarise your experience? What major challenge would you like to see the RIs address?" (*and general remarks about what would be helpful to partner with RIs*)

**Remarks:**

- What would be very 'powerful' is if we have evidence-based success stories we can show our funders
- There's increasing interest in different services (provided by the RIs)
- What could be of value is some sort of certification to encourage use of RIs → could revolutionise the user community if we could tap into this 'preferred route'

**Item 7: Keynote**

**Speaker: Lucia Banci (CERM)**

Note: see slides[4]

**Item 8: LS RI Website**

**Speaker: Caitlin Ahern (BBMRI)**

New website going live soon (www.lifescience-ri.eu), Caitlin will send information once available; website will look similar to the CORBEL website. Information requests will be sent to the RIs to update the content. Will be managed by Caitlin (BBMRI).

## Conclusion

The day was very rich in terms of presentations and discussions. Key takeaways included:

- There is a need to promote the use of RIs at national level (with members having a potential leading role to play here, as feasible)
- To promote RIs, we need to enhance our communication, and clearly explain what we are, what we do, and the services that we can offer (this is already being developed through various projects: ERIC Forum, RI-VIS)
- CORBEL has had immense added value in promoting access to services, tools, and/or expertise that would otherwise not be available to researchers at their local institutions
- There is a need for use-cases to illustrate the added value of RIs (and projects like CORBEL), so that we can show funders (and members, partners, etc.) how the use of RIs makes research better
- Much of CORBEL's data work will be continued through EOSC-Life, which will address the various data-sharing issues initiated through the project
- In terms of multimodal data, there is a need for tailor-made solutions
- We also need to tailor RI services to users; for this purpose, feedback is critical

## Next steps

More user engagement activities had been planned during the last 3 months of the CORBEL project, but had to be postponed, changed to online courses or cancelled due to the COVID-19 crises. These include:

– A workshop on 'Data visualisation for biology', organised by WP9 (16-20 March 2020, Hinxton, Cambridge, United Kingdom) → online course
– A joint booth at the 15th European Molecular Imaging Meeting (24 - 27 March 2020, Thessaloniki), organized by 3-4 participating RIs (discussions ongoing). Euro-BioImaging secured also a slot in the scientific program and invited other RIs to contribute to a joint session. → postponed to August 2020

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[4] https://drive.google.com/file/d/1I2PiTqTcflprvnQK4sAKReer6grifXnX/view?usp=sharing

–   A workshop on 'Best practices in Biomedical Public-Private Research Collaborations', organised by WP8 (21-22 April 2020, Riga, Latvia) → cancelled

–   WP4 will organize a training workshop in Villefranche, 27-29 May 2020. This workshop originated from the very successful collaboration between two Open Call service providers (Euro-BioImaging EMBL-Node and EMBRC Villefranche) and their user. The workshop will be broadly advertised and invite participants internal and external to the consortium. WP2 will support the communication and outreach activities. → postponed

–   Usability testing and review of ARIA is currently being undertaken by WP5 to improve the user experience and design to better meet the needs of different types of user. Usability testing is a technique used to evaluate the platform by testing it on real users. Participants are asked to perform a series of tasks and are encouraged to speak their mind as they do so. By observing how people interact with the platform and analysing the data, usability issues can be identified and a real understanding of user behaviour can be gained. Together this ensures that well informed design decisions are made.

–   The CORBEL webinar series will be continued until the end of the project.

–   Survey among the users and service providers of the 2nd Open Call (ongoing)

–   A new website for the Life Science RIs has been developed and launched on 27 March 2020[5]. This website aims to be a common source of comprehensive information about the 13 RIs, their activities, offers, news and funding opportunities and will serve as a single information portal for scientists and other stakeholders beyond the lifetime of CORBEL. Moreover, the web contents of the CORBEL Innovation Helpdesk have been migrated to the new site, and it also provides information about the ELSI services.

–   Initiated by WP4 as one of their measures for long-term sustainability of the developed common access pipelines, WP2 supported the development of a brochure highlighting the impact of the CORBEL Open Calls. Success stories on user projects illustrate the benefits CORBEL provided. The research infrastructures that committed themselves to continue with joint access provision are also introduced in the brochure. The brochure will be distributed at all upcoming relevant events during the lifetime of CORBEL and after.

–   WP4/WP2 will be producing a series of animated videos, which will be used for the advertisement of joint service provision under CORBEL and beyond. The videos will be placed on the new Life Science RI website and will be available for presentations and other outreach activities. The focus of the first video will be on the concept of RIs and their service offers. The second video will highlight the impact of working with multiple RIs on the basis of selected success stories.

## Abbreviations

CORBEL: Coordinated Research Infrastructures Building Enduring Life-science services

MIUF: Medical Infrastructure/Users Forum

RIs: Research Infrastructures

WP: Work Package

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[5] https://www.lifescience-ri.eu

## Delivery and schedule

The delivery is delayed: No

## Adjustments made

Due to the extension of the CORBEL lifetime until 31 May 2020, the 4th AGM was postponed from autumn 2019 to 2 March 2020 (Brussels, Belgium).