

IMI2 Project 802750 - FAIRplus
FAIRification of IMI and EFPIA data

WP4 – Communication and outreach to FAIR data user community

D4.3 FAIRplus Fellowship Curriculum

Lead contributor	Dr Andreas Pippow (Fraunhofer) Franziska Kroh (Fraunhofer) Andreas.pippow@fit.fraunhofer.de
Other contributors	Fraunhofer (2)

Due date	30 th June 2020
Delivery date	
Deliverable type	R
Dissemination level	PU

Description of Work	Version	Date
	V1.2	15 th of June 2020

Document History

Version	Date	Description
V1.2	15th June 2020	First Draft
V1.3	19th June 2020	Comments
V2.1	25th June 2020	Draft 2
V3.0	29th June 2020	Final Version

Table of Contents

Document History	2
1. Curriculum Summary	3
2. Methods	4
3. Results	4
3.1. Expectations and Goals of the FAIRplus Fellowship programme	4
3.2. The FAIRplus FAIRification process and its input on the course structure	6
3.3. Course Structure	8
3.4. Course Timeline	11
3.5. Course Materials and Access	12
3.5.1. Required Materials	12
3.6. Course Assessment and Certification	13
4. Discussion	14
5. Conclusion	15

1. Curriculum Summary

FAIRplus offers the Fellowship programme to educate future FAIR experts who will in turn, transfer the FAIRplus knowledge to other institutions, thus acting as knowledge multipliers. By pooling people from academia with expert partners from SMEs and EFPIAs, and leveraging on the content of the FAIR Cookbook and its authors, the programme provides an opportunity for researchers and practitioners to make data FAIR.

The purpose of the Fellowship programme is to train eligible PhD students and/or postdoc level individuals together with industry partners (from the EFPIA and SME network) so that they get a better understanding of

- what FAIR means for their industries
- when FAIR is FAIR enough
- why FAIR data is so essential to today's life science industry
- how to transform or initiate a FAIRification process in their organisations
- how to advise internal departments and teams to make their data FAIR

An increased knowledge transfer for FAIR data transformation will naturally lead to a wider sharing of best practices, greater opportunities for innovation, and more insights.

The fellowship programme is open for applicants from three different professional groups (please see picture in Figure 1 for more detail):

- EFPIA partners
- SME partners
- and affiliated academics, e.g. PhD students and postdocs

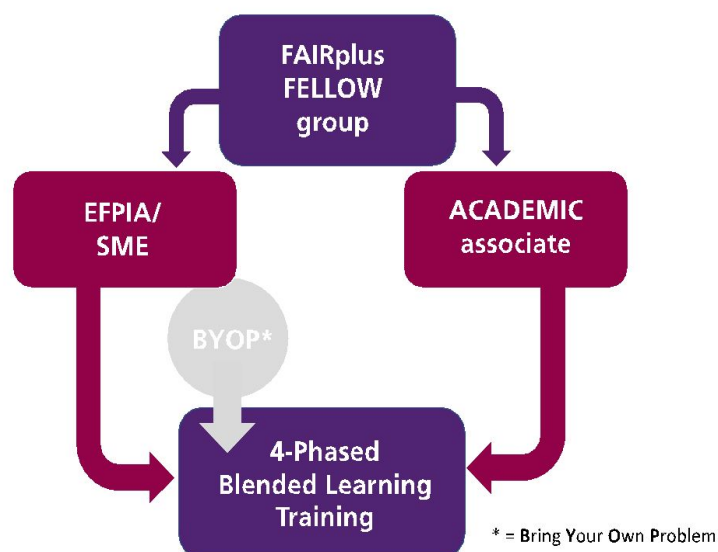


Figure 1. Fellowship Collaboration Model: The 3 groups being represented on two sides: a real-problem/real-case side (EFPIA and SME) and an academic-theoretical side (academic associates).

2. Methods

The FAIRplus Communication and Outreach Team (WP4), identified the fellowship structure, procedure, eligibility, and the curriculum. As well as advertising of the programme, timeframes and deadlines were agreed upon in conjunction with other WPs and colleagues. Regular meetings were scheduled between the project lead and the project team for the fellowship programme in order to discuss the main procedures and the curriculum via email and telephone. Recently, discussions about the content of the fellowship programme emerged again and spread through a wider audience (meaning more WPs). The process is continuing also after this deliverable will be sent.

Table 1. Fellowship programme Team

Contact person	Institute
Dr Andreas Pippow (M)	FIT Fraunhofer
Franziska Kroh (F)	FIT Fraunhofer

3. Results

The results accomplished are as follows. Note: a thorough description of the application procedure and adjunct deadlines, as well as details of the fellowship curriculum, are going to be published on the FAIRplus website in order to attract potential candidates interested in FAIR data management project work.

3.1. Expectations and Goals of the FAIRplus Fellowship programme

Fellows, who successfully conclude the programme, will be able to confidently distribute their FAIR data knowledge and thereby become FAIRplus Ambassadors within their own organizations and beyond.

During the fellowship programme period, formal and practical training will cover the

theory as well as the implementation of FAIRification processes (for more details on the FAIRification process, see 3.2). Participants will also be expected to apply FAIR tools and workflows throughout the fellowship programme and reflect critically on the entire process and its practicability.

The programme currently consists of four different stages that cover a period of 9 months, starting May 2021 and concluding with a plenary session in January 2022. The programme is designed *extensively* rather than intensively in order to enable participants to follow the programme while continuing their day-to-day work.

The main goal of the FAIRplus fellowship programme is the acquisition of all necessary know-how that leads to various stages of FAIRification of different data sets. The FAIRplus FAIRification process, developed by WP2 and WP3 is currently serving as the backbone of the fellowship curriculum and is a standard procedure that demonstrates pharmaceutical datasets can be made FAIRer, both for new and existing data.

Participants are expected to attend all phases, participate actively within their learning communities, invest regular time and necessary individual research while being on the programme and maintain an analytical and self-motivated attitude throughout the duration of the course.

The next figure below illustrates all of the four stages in a flow diagram:

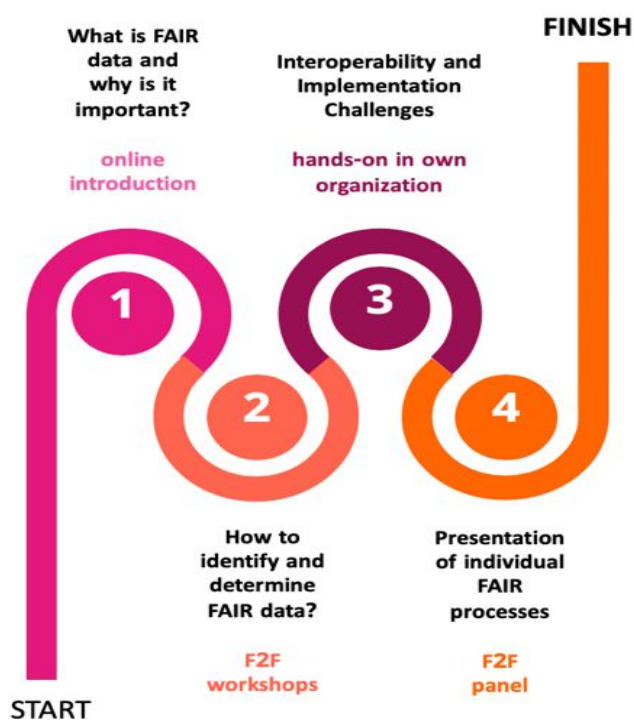


Figure 2: Fellowship Course Model: The 4 phases of the FAIRplus Fellowship Model, ranging from online, face-to-face, online coaching and plenary.

3.2. The FAIRplus FAIRification process and its input on the course structure

FAIRplus seeks to establish 'FAIRification' processes that can be used at scale to ensure FAIRness of IMI data. In order to establish, refine and validate FAIRplus FAIRification techniques, four pilot IMI datasets were selected in order to exemplify the so far established FAIRplus FAIRification process.

The FAIRified pilot datasets are listed in the IMI data catalogue, along with an evaluation of their level of FAIRness. This level is supported by a series of FAIR indicators, established from a FAIR assessment conducted on each dataset before and after FAIRification. The results of these assessments are linked to the IMI data catalogue. In addition, all processes used during FAIRification are documented as recipes in the FAIR cookbook, which constitutes an integrated part of the FAIRplus fellowship programme.

The recipes in the FAIR cookbook were defined during FAIRification activities for

these pilot projects; however, they will be further refined as they are applied to future selected projects, which might alter the current structure of the FAIRification process. If major changes are agreed on within the work packages 2 and 3, the FAIRplus fellowship programme will also accommodate these changes up until the start of the programme in April / May 2021.

The FAIRplus fellowship programme consists of 4 separate parts and 12 mandatory modules. As said above, some aspects of the FAIRification process might be subject to change. Any changes made to the FAIRification process will be reflected in the fellowship programme and adjusted accordingly. At the moment, however, the process as shown below mirrors the current structure of the fellowship programme. In addition to the 11 steps and one mandatory introduction module, 5 more modules will be added as optional content.



Figure 3: The FAIRplus FAIRification Process (2019): The 4 phases of the FAIRplus Fellowship Model are cutting the process in three equal parts.

In order to achieve the most learner-centred focus on the process, we use different instructional designs and methods for each phase of the programme. As all methods and designs are directly linked to the content and particular learning outcomes, the programme has the aim to enable participants to not only conduct a FAIRification process from beginning to end. It also aims to enable all fellows to use a step-by-step approach by analysing and evaluating general FAIR processes, alternate and adapt workflows where necessary and provide constructive feedback as well as leadership in their organization's FAIRification processes.

The table below sums up all topics taught on the programme and their respective design:

Table 2. Fellowship programme Modules

module title	module type: online lecture, F2F, jury, online coach
Introduction to FAIRplus fellowship programme	Online
FAIRplus Introduction	Online
FAIR data introduction	Online
FAIRification Process Introduction	Online and perhaps WS F2F
Change Management Introduction	Online
Data Access and Ethics	Online
Competency Questions	Online
Introduction to Interim Hosting	Online or perhaps F2F (60 – max 90 minutes)
WS on Data Examination (CMMI-Model introduction)	F2F/online
WS on Identification of Data Types	F2F (60 – max 90 minutes)
WS on Determination of Identifiers	F2F (60 – max 90 minutes)
WS on Metadata Strategies	F2F (60 – max 90 minutes)
WS on Interoperability Requirements	F2F or online (60 – max 90 minutes)
WS on Hosting Requirements	F2F (or online 60 – max 90 minutes)
WS on Data Sharing Solutions	F2F or online (60 – max 90 minutes)

3.3. Course Structure

Since participants have a variety of backgrounds and come from different countries and cultures due to their connection to various FAIRplus project partners, it was clear from the beginning that the design of this programme needs to be flexible, yet clearly structured and modular. This flexibility is achieved by delivering some modules purely online and others in a face-to-face setting. Variations between the two main instructional styles, face-to-face and online, give every participant the time to gather vital knowledge, while providing enough opportunities for peer-learning and

exchange.

The short face-to-face events thereby foster reflection, group discussions and a solution-oriented mind-set, while requiring a thorough understanding of the subject matter, outside-the-box-thinking and teamwork. The different phases as outlined above, include the following instructional styles:



Figure 4: The FAIRplus Fellowship programme: The 4 phases of the FAIRplus Fellowship Model.

Phase 1: Introduction to the FAIRplus project, change management and data access

After a short face-to-face kick-off event mid April 2021, participants receive access to an online learning portal, where all online modules for the first phase can be viewed. Participants will first have to get familiar with the online platform, which at the same time serves as the communication and instruction platform throughout the entire duration of the programme.

In this first phase, participants work through the online modules at their own pace and in their own time. Bi-weekly tasks and end-of-the-phase quizzes will have to be sent in to course supervisors, so that an equal understanding of theory and content can be guaranteed. Course supervisors accompany the learners through the course thereby supporting the learning process. Their main role is tutoring the learners and referring questions to the subject matter experts of the individual modules.

Phase 2: Identification of data types, determination of identifiers and metadata strategies

In Phase 2 of the FAIRplus fellowship programme, the fellows meet each other face-to-face in a 2-day workshop. They work together towards set outcomes in small groups. The aim of this second phase is firstly, to develop a basic understanding of FAIR data standards and secondly, to adapt those practically and individually to their respective projects. This particular learning setting provokes a variety of discussions among members of a group and in-between groups. Peer interaction is part of an instructional design, that engages participants to bring in their own opinions, experiences and thoughts individually as well as collectively to arrive at new approaches, solutions and perspectives on the topic. Communication and collaboration are key 21st-century skills, but these skills have to be continuously developed, trained and coached. Phase 2 demands a lot of its participants. However, the results are vital for the continuation of the programme and build the core of the FAIRplus fellowship programme.

In a subsequent plenary session, discussion points of the different groups and also first results are presented, so that a conceptual and homogeneous picture of the challenges and possible obstacles that accompany a FAIRfication process emerge.

Phase 3: Interoperability and hosting requirements, and data sharing solutions

Phase 3 integrates the knowledge already acquired in the organizations and institutions of the fellows. Phase 3 is logistically self-organized by the teams that have been grouped together in phase 2. Fellows will now get the opportunity to gain insight into each other's project environments in order to present imminent implementation problems to each other. While providing support to each other and continuing exchange, interoperability and infrastructure problems will be addressed.

Phase 3 is guided by the principle that it should never matter just what learners - or in our case fellows - know. What matters is, what they can do with what they know.

At this stage, the idea of the fellowship is brought into practice: the aim is to apply the knowledge acquired so far to the real conditions of the organization. The main focus is on the technical implementation of FAIR data processes. Which hosting

requirements are needed to successfully integrate the project? What interoperability requirements are needed to use FAIR data within an organisation? Which infrastructures already exist that can be used for these purposes and which ones might still have to be created?

All these aspects will be analysed, evaluated and implemented in small teams over a period of three months. In this phase, the participants will encounter a wide variety of problems and hurdles that can either be successfully overcome within this phase or that require a longer-term solution for which only an outline of the solution can be sketched. The results and obstacles of this phase will flow directly into the fourth and final phase of the fellowship programme. The group's results will be presented in a final plenary session and to a jury.

Phase 4: Presentation of FAIRification processes, challenges and solutions

Phase 4 also concludes the FAIRplus fellowship programme.

The fellows will be required to present their FAIRification project results to expert representatives from EFPIA companies and the IMI consortium to demonstrate their capability as FAIR data experts. At the end of the day, participants will receive formal certificates and celebrate the end of the FAIRplus fellowship programme with a networking event.

Latest updates and developments on FAIR processes are provided by the FAIRplus online learning platform. Every participant can thus continue expanding his or her knowledge during the following 12 months upon their desire, stay in contact with other participants, continue to support each other in their respective projects and, last but not least, keep contact with our FAIRplus experts for advice and assistance.

3.4. Course Timeline

The timeline for the entire programme, divided in four phases, stretches over nine months. As there are long stretches in between the phases, participation in the programme allows for the continuation of normal professions or research work.

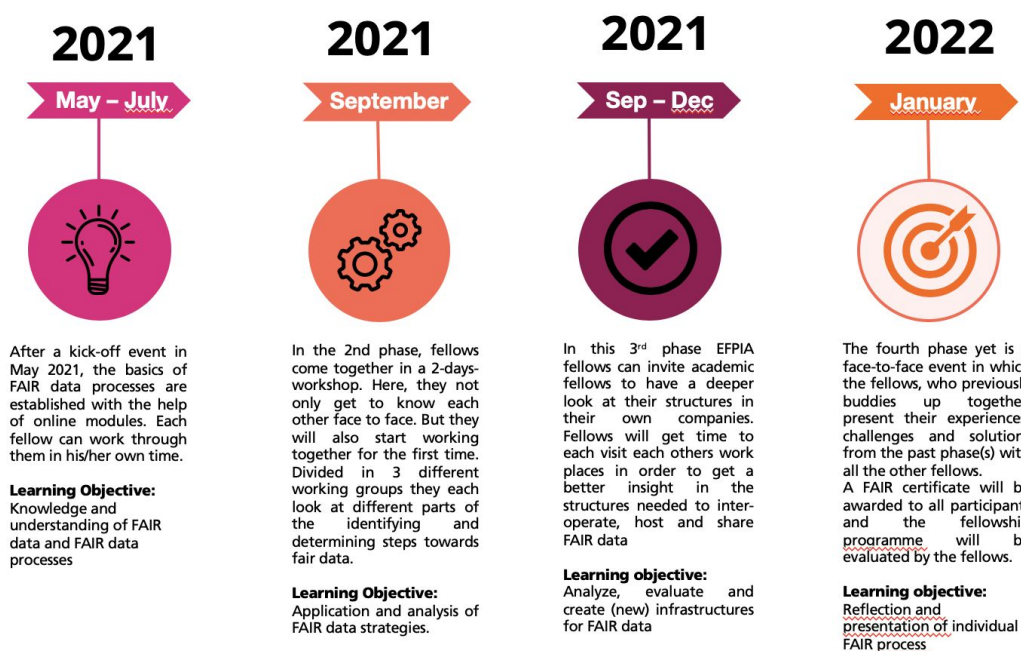


Figure 5: The FAIRplus Fellowship Timeline.

The Kick-Off-Event, the workshops and the final presentation (phase 3 and 4 of the projects) will be confined to particular days, which will be announced later. All participants are required to take part, without any exception. The exact dates will be announced at the very beginning of the programme. Participants unavailable on these two events might have difficulties completing the programme. In these cases, individual solutions might have to be found or participants will have to be excluded from the programme.

3.5. Course Materials and Access

3.5.1. Required Materials

The course materials are mostly created and produced with and by experts knowledgeable and professionally involved in the FAIRplus FAIRification process and the FAIR Cookbook. Material production is preferential to curation of existing FAIRdata material online. Our analysis of the existing FAIRdata material showed that these were focused on specific target groups or contained copyrighted materials. Therefore, and after thorough scanning of existing online training material, lectures,

accessible PDFs and PPTs, we came to the conclusion that the modules for the fellowship programme would need to be predominantly created instead of curated, and for the consistency the modules will be aligned to and leverage on the FAIR Cookbook.

After an initial “expression of interest” from experts within the FAIRplus team, the WP4 team that is primarily taking care of the conceptualization, production, delivery and roll-out of the programme, will contact volunteering experts in order to discuss the following steps necessary to create a unique yet uniform-looking course programme on each of the 11 steps of the FAIRplus FAIRification programme. The accessible materials will take the form of texts, training manuals, exercises and discussion forums presented with the help of the open source Learning Management System (LMS) “ILIAS” and the authoring tool “Articulate 360”.

The mode of instruction will therefore be varying from expert to expert and can range from podcasts, vodcasts, texts and essays, animated videos and audio-presentations. A variety of presentation styles also hopefully caters for learning-style diversification and different, highly individual modes of information processing.

In order to filter out the most important aspects of each and every module, experts will have to go through a set of course design questions together with the e-learning team from Fraunhofer FIT (St Augustin). In no stage of the production cycle are experts left alone. There will be individual guidance, support and help for as much as the expert wishes and needs from the elearning team at Fraunhofer FIT.

3.6. Course Assessment and Certification

The FAIRplus fellows will not be assessed only at the end of fellowship programme, as this might be lacking a comparison benchmark. All candidate fellows will be assessed at the very beginning of the course by stating their interest, motivation and current skills and their expertise. This is done by an independent jury in the months of October and November 2020. The jury will be assessing the fellows in regards to their eligibility of the course programme and their availability throughout the course time. The jury and instructors are also able to discover the candidate fellows’

strengths and weaknesses, which allows for the developing team to tailor the course based upon individual needs before its start.

Each fellow is also tested in each module with quizzes, multiple-choice tests and interactive discussion panels as well as hands-on tasks. Though no formative assessment will be defining the success of a fellow throughout the programme, a summative assessment – the sum of all performance relevant parts of the programme – will give the jury an indication of completion level at the end of the course.

The final assessment consists of an oral presentation of the fellow's own FAIRification process. Fellows will have to show their level of understanding, their reflective comprehension of the course content and ability to convey and multiply the ideas and standards of FAIR data within and beyond their own organizations. This is summarized in a short written feedback that will accompany the FAIRplus certificate.

The summative assessment also serves to identify areas of improvement for the course and process on a general level. For example, if most of the fellows would fail to have acquired the necessary knowledge throughout this training programme, then the course structure may have to be redesigned and the learning strategy adapted for follow-up courses (if this scenario applies).

After the completion of the fellowship programme, further online learning resources can be offered to those who might still lack necessary skills, information or mediation strategies. This is provided and made accessible on a separate platform, and serves to establish networking links amongst fellows.

Successful participants will be awarded with a certification of completion at the end of the FAIRplus fellowship programme defined by the following criteria:

- full attendance in each phase of the fellowship programme
- active participation in the online as well as off-line seminars, discussions and fora
- completion of all phases, tasks and MC-tests in each programme module
- delivery of reflective presentation on individual FAIRification process at the end of the course in front of expert panel

4. Discussion

Completing the programme will enable all successful candidates to work independently as FAIR data advisors. Fellows will achieve a substantial amount of hands-on-practice in the field of FAIR data and hopefully instigate valuable business exchange and feedback. Industry partners will gain a substantial insight into FAIR procedures and methodologies. With the Fellowship programme, FAIRplus will be able to establish a pilot in which experts from many fields will be able to give insurmountable feedback on the FAIR guidelines and procedures and will be rewarded with a better idea of future training.

Over the following months the Communications and Outreach Team will work towards the alignment of content and procedures, update the course structure if necessary and adapt the structure to the latest standard of the FAIRplus FAIRification tools. The main focus in the coming months will be to finalise the online modules and create content that enables all learners to follow the programme in an engaging manner. It is intended to publish these modules with a creative commons license to support sustainability of the material.

5. Conclusion

We have seen that creating the FAIRplus Fellowship programme needs the active support from specific work packages that are working on the FAIRplus toolkits and procedures. This support is given and needs to be further strengthened. In order to make the programme a success, many more decisions must still be taken.

One of the next milestones will be to develop the online modules and agree on a learner-centred approach that makes it easy for fellows of different knowledge levels to follow. Therefore, possible participants' current knowledge and needs will be analysed and a good understanding of their problems achieved through a variety of interviews.

As the programme develops, we will need further input, support and regular communication with FAIRplus working groups concerned with FAIRification processes. A separate working sub-group will have to be established in order to follow the guidelines given by the experts thoroughly. A curriculum has been planned but adjustments may need to be made as specific needs are highlighted.. However, the overall four-phase-structure will be maintained, and content will be adapted where necessary and where advised by other work package members.