



# ELIXIR Training as a Service

## *Empowering Scientists to Provide High Quality Training*



*Celia van Gelder (ELIXIR-NL), Patricia Palagi (ELIXIR-CH), Gabriella Rustici (ELIXIR-UK), Pascal Kahlem (ELIXIR-Hub) & on behalf of the ELIXIR TrCG group*

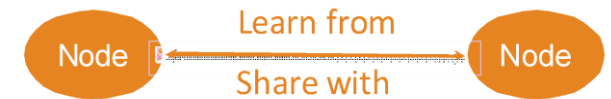


ELIXIR-CZ Annual Conference, 21-22 November 2018

[www.elixir-europe.org](http://www.elixir-europe.org)

# ELIXIR Training Platform

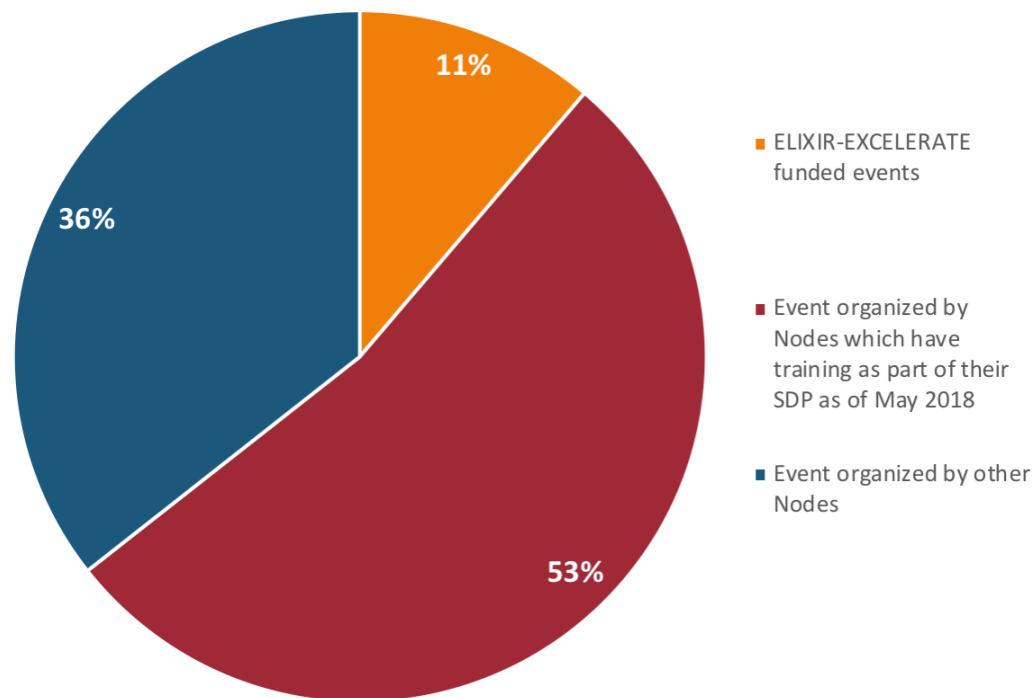
- **Build a sustainable training infrastructure** - supported and adopted by all member states
- **Deliver a coherent, high-quality and impactful ELIXIR training program**
  - addressing training gaps
  - growing bioinformatics capacity and competence in Europe
  - empowering researchers across Europe to use the ELIXIR services and tools
- **Builds on and complements trainings in ELIXIR Nodes**



# ELIXIR Training infrastructure - in summary

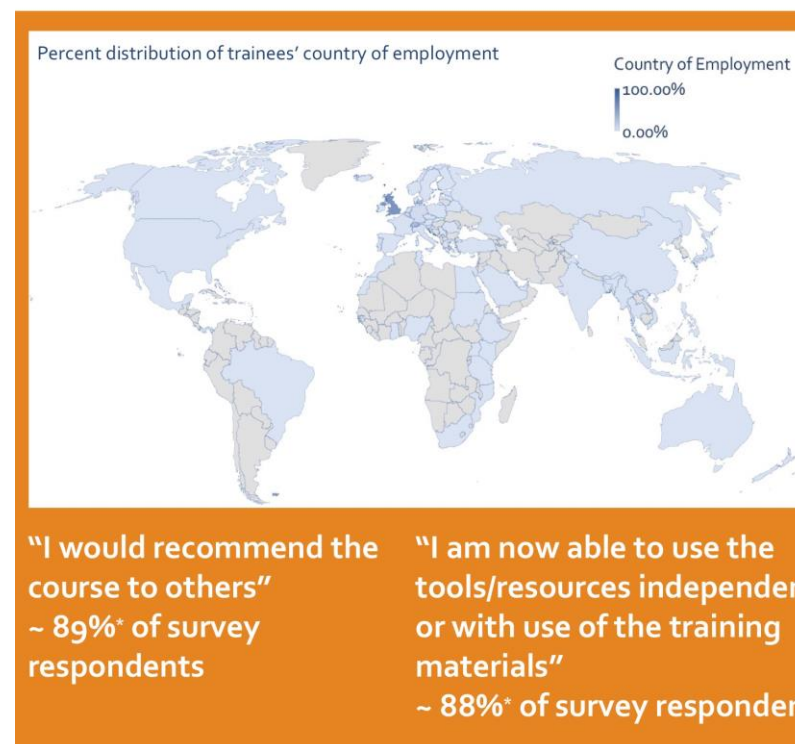
- **Training events** for researchers, developers, trainers and infrastructure operators
- Large **pool of ELIXIR trainers** (Train-the-Trainer) and developed **TtT framework**
- **TeSS portal** to share and exchange training content and events <http://tess.elixir-uk.org>
- Training best practices and guidelines, including standardized metrics for impact assessment - **Training Toolkit**
- Solutions to ease training and communication: E-learning platform and Virtual Coffee Room (VCR)

# Summary statistics for the ELIXIR training programme 2015-2018



**Sept 2015 – May 2018**

*N.B. For the node trainings this is an underestimate since not all nodes have provided complete information yet*



**ELIXIR Training: Quality and Impact**

<https://www.elixir-europe.org/platforms/training>



**570\*** training events  
**9680\*** people trained  
from **65\*** countries  
**19\*** ELIXIR Nodes  
providing training

**ex**celerate  
\*Sept 2015 - May 2018



# Train-the-Researcher (TtR) & Train-the-Developer (TtD)

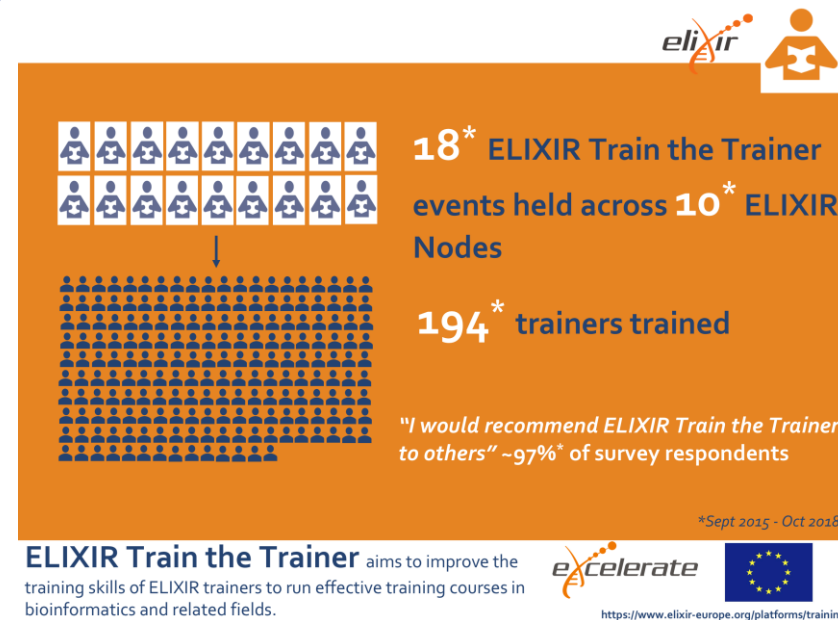
Since 2015, we run **ELIXIR-EXCELERATE-funded TtR and TtD events**, covering:

- Workflow tools (Galaxy, Chipster), High Performance Computing, Python, Unix/Linux, AAI Workshop
- Use Case community-driven training: Variant analysis, Genome annotation & assembly, Metagenomics
- **e-learning courses** ran using ELIXIR-SI EeLP (<https://elixir.mf.uni-lj.si>), including Unix, Genome Assembly and Annotation, RNA-Seq data analysis using Chipster and HPC.





# Train-the-Trainer (TtT) - Building a highly-skilled and coherent community of trainers


- Created an ELIXIR TtT programme with a set of materials and course layouts
- Created a TtT Exchange program – support trainers and Nodes



## OPINION ARTICLE

The ELIXIR-EXCELERATE Train-the-Trainer pilot programme: empower researchers to deliver high-quality training [version 1; referees: awaiting peer review]

✉ Sarah L Morgan<sup>1</sup>, Patricia M Palagi <sup>2\*</sup>, Pedro L Fernandes<sup>3\*</sup>, Eija Koperlainen<sup>4</sup>, Jure Dimec<sup>5</sup>, Diana Marek<sup>2</sup>, Lee Larcombe<sup>6</sup>, Gabriella Rustici<sup>7</sup>, Teresa K Attwood<sup>8</sup>, ✉ Allegra Via <sup>9</sup>

A new pan-European Train-the-Trainer programme for bioinformatics: pilot results on feasibility, utility and sustainability of learning 

Allegra Via ✉, Teresa K. Attwood, Pedro L. Fernandes, Sarah L. Morgan, Maria Victoria Schneider, Patricia M. Palagi, Gabriella Rustici, Rochelle E. Tractenberg ✉

# TtT Course setup

The TtT courses are organized around four sessions:

- Learning principles and how they apply to training
- Training techniques that can be used to enhance learner engagement and participation
- Assessment and feedback in training
- Session, course, and materials design

The Learning Objectives are:

- To get acquainted with learning principles and how they apply to training
- To be able to select and use training techniques that can enhance learner engagement and participation
- To learn how to use assessment and feedback in training
- To learn how to design a session, a course, and course materials







# Teaming up with The Carpentries

- Pilot Software and Data Carpentry in 2015/16: 278 life sciences researchers and 63 instructors trained
- Since 2017:
  - > 40 ELIXIR courses have been delivered, many more delivered by the ELIXIR Nodes themselves
  - ELIXIR/Carpentries [agreement](#) to support the rolling out across Nodes:
    - 20 Software Carpentry and Data Carpentry workshops
    - 2 Instructor trainings

OPINION ARTICLE

**Developing a strategy for computational lab skills training through Software and Data Carpentry: Experiences from the ELIXIR Pilot action [version referees: 3 approved]**

✉ Aleksandra Pawlik<sup>1</sup>, ✉ Celia W.G. van Gelder <sup>2</sup>, ✉ Aleksandra Nenadic <sup>3</sup>,  
Patricia M. Palagi<sup>4</sup>, Eija Korpelainen<sup>5</sup>, Philip Lijnzaad<sup>6</sup>, Diana Marek<sup>4</sup>, Susanna-Assunta Sansone<sup>7</sup>, John Hancock<sup>8</sup>, Carole Goble<sup>3</sup>

**F1000Research**  
Open for Science





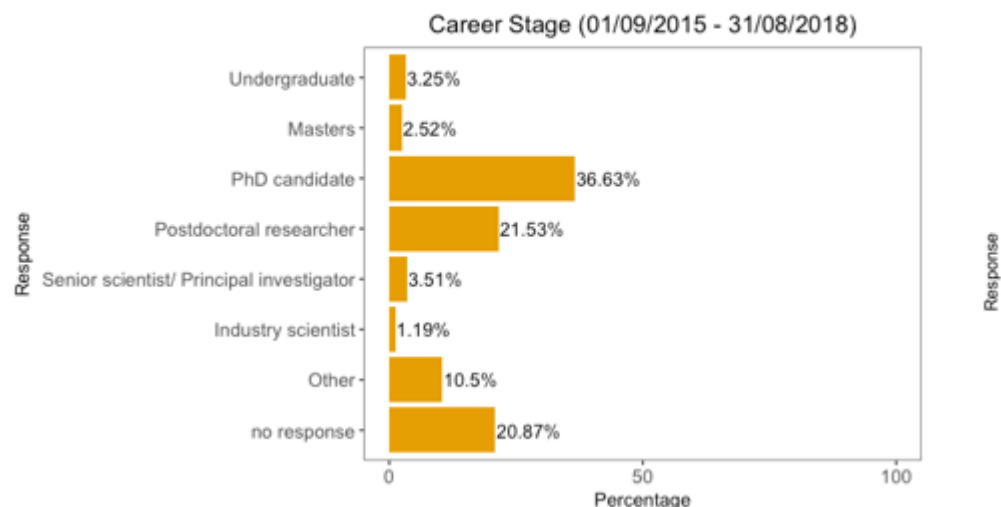
# ELIXIR Training Quality & Impact assessment strategy

- Minimal set of descriptors for training events and materials
- Set of core metrics and feedback surveys, for both short and long term
  - Adopted by 15 ELIXIR Nodes
- Platform for data collection is being set up: First version ready for testing by TrCG, expected roll out early 2019
- Tailored for and adopted by EOSC Life and European Joint Project on Rare Diseases Projects



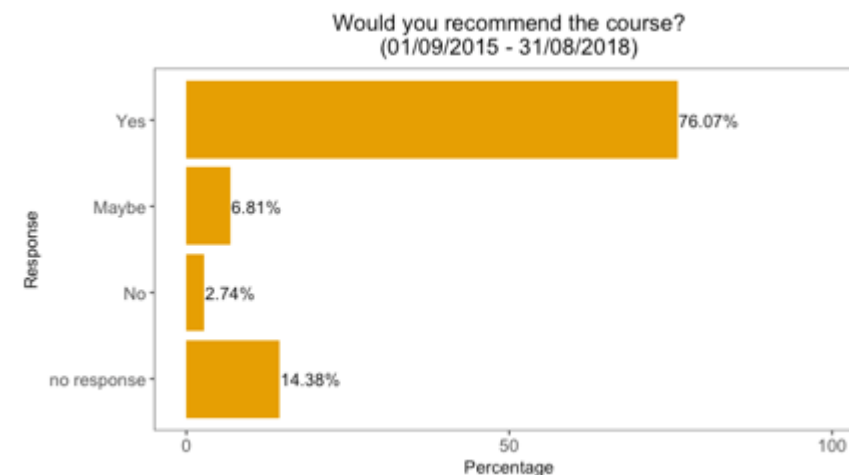
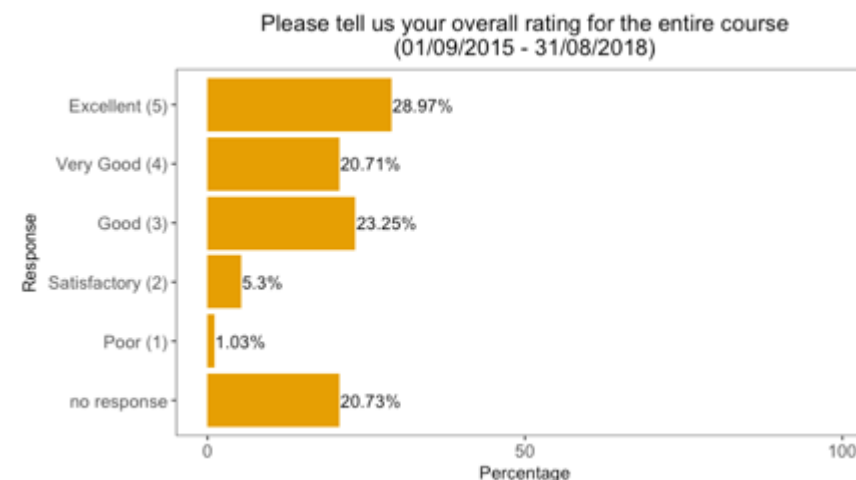
# Quality & Impact assessment – Short term feedback surveys

## Career Stage





In the time period September 2015-August 2018, **short-term feedback** data has been collected for **307** training events run across **18** Nodes with **5040** short term survey responses collected

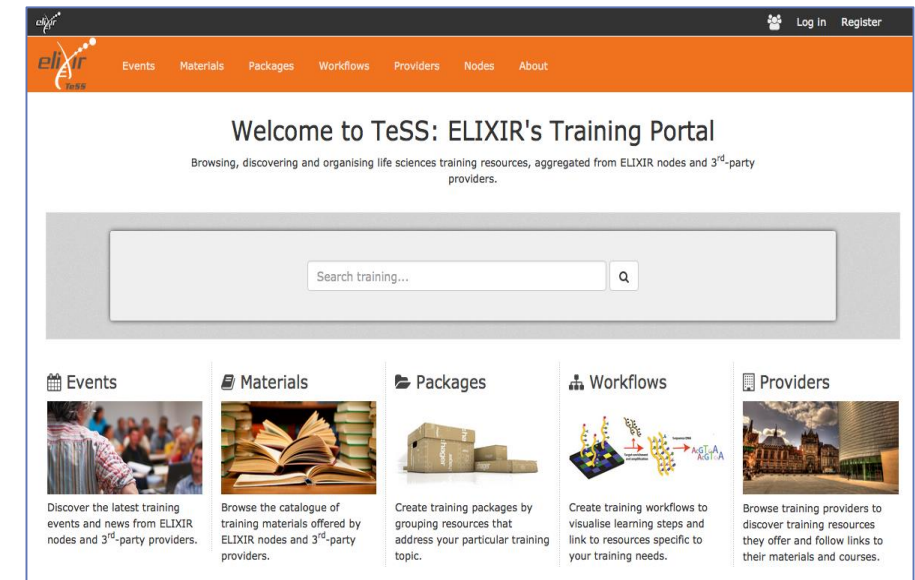
Data provided by Kim Gurwitz, ELIXIR Training Platform Quality & Impact coordinator



# ELIXIR Training Portal TeSS

Aggregate, disseminate and coordinate information on ELIXIR's training activities/material and beyond

- 1023 training materials
- 48 content providers: 21 scraped automatically, 13 ELIXIR Nodes
- 4,934 unique users (2017-18)
- 308 upcoming events listed
- AAI and  Bioschemas integration
- Linked to other ELIXIR registries: bio.tools and  FAIRsharing
- Events annotated with EDAM topics terms
- <https://tess.elixir-europe.org>



# TeSS - Training Events

**Date Added**  
Anytime ▾

**Scientific topic**  
Metabolomics 4

**Event type**  
Workshops and courses 1

**Online**  
☐ Only show online events

**Country**  
United Kingdom 8  
Switzerland 1

**City**  
Birmingham 6  
Cambridge 2  
Lausanne 1

**Target audience**  
Academics 1  
Graduate students 1  
Industry 1  
PhD 1  
PhD students 1

Subscribe ▾

Show past events

**9 events found**


Search query: **metabolomics** ✕


Grid Map


What are events in TeSS?


metabolomics 🔍


Earliest ▾

**Introduction to Metabolomics for the Microbiologist**  
19 - 21 September 2018  
Birmingham, United Kingdom  



**Introduction to Metabolomics for the Clinical Scientist**  
22 October 2018  
Birmingham, United Kingdom  



**Metabolomics for Life and Health Scientists**  
3 - 4 December 2018  
Lausanne, Switzerland  



**Introduction to Metabolomics for the Environmental Scientist**  
27 - 28 September 2018  
Birmingham, United Kingdom  


**Metabolite identification with the Q Exactive and LTQ Orbitrap Elite**  
22 - 23 November 2018  
Birmingham, United Kingdom  


**Introduction to Metabolomics Analysis**  
4 - 8 February 2019  
Cambridge, United Kingdom

**Metabolomics Data Processing and Data Analysis**  
8 October - 2 November 2018  
Birmingham, United Kingdom  


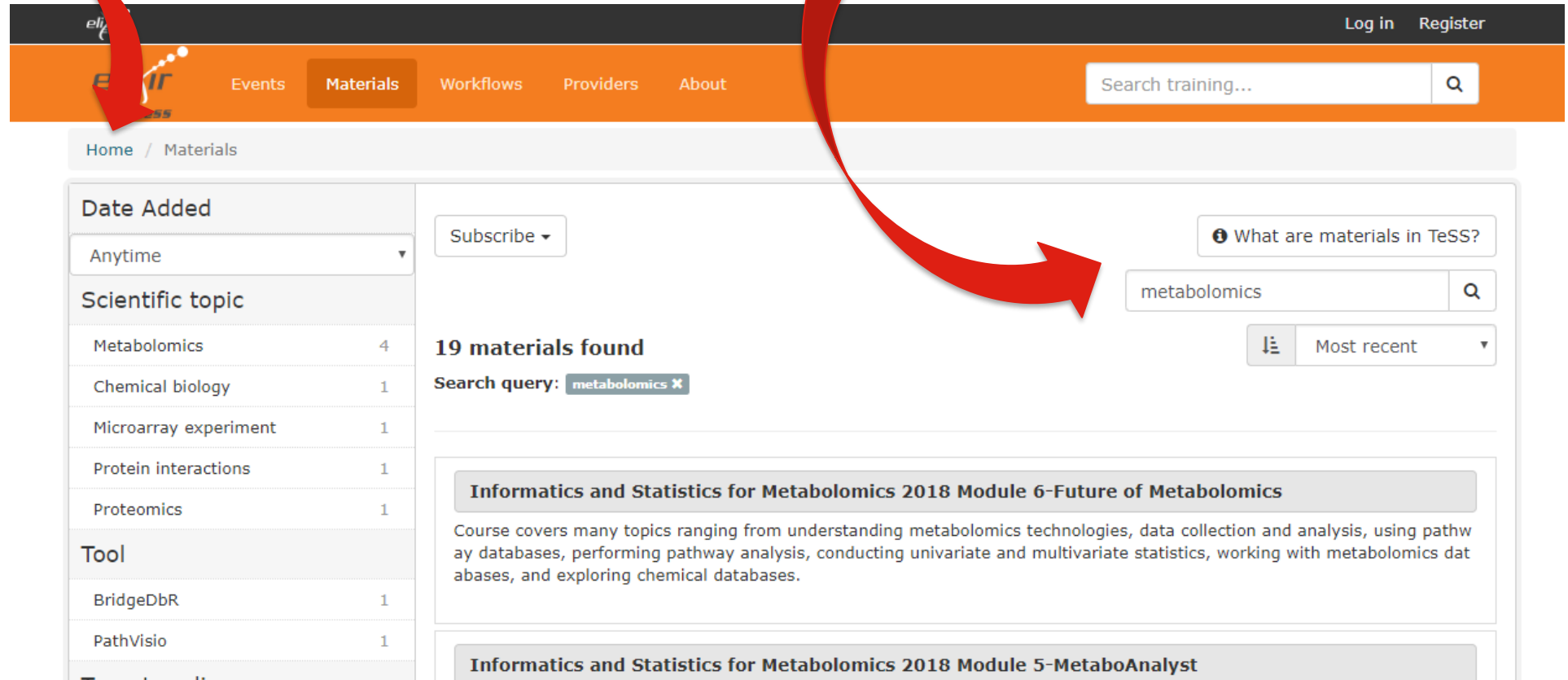
**Introduction to Metabolomics for the Clinical Scientist**  
22 October 2018  
Birmingham, United Kingdom  


**Metabolomics Bioinformatics for Life Scientists**  
4 - 8 February 2019  
Cambridge, United Kingdom  


# TeSS - Materials

Filter By:

**Content Provider**  
**Scientific Topic**  
**Tool**  
**Standards**  
**Policies**  
**Target Audience**  
**Keyword**  
**Difficulty Level**  
**Author**  
**Contributor**  
**Licence**  
**ELIXIR Node**



The screenshot shows the TeSS Materials page. The top navigation bar includes links for Events, Materials (highlighted), Workflows, Providers, and About. A search bar labeled "Search training..." is located in the top right. Below the navigation bar, the breadcrumb "Home / Materials" is visible. On the left, a filter sidebar lists various criteria: Date Added (Anytime), Scientific topic (Metabolomics: 4, Chemical biology: 1, Microarray experiment: 1, Protein interactions: 1, Proteomics: 1), Tool (BridgeDbR: 1, PathVisio: 1), and Target audience. The main content area displays "19 materials found" for the search query "metabolomics". A red arrow points from the "Search for text and order results" text to the search bar. Another red arrow points from the "Filter By:" text to the filter sidebar. A third red arrow points from the "Search for text and order results" text to the search results area.

Search for text and order results

Filter By:

Content Provider  
Scientific Topic  
Tool  
Standards  
Policies  
Target Audience  
Keyword  
Difficulty Level  
Author  
Contributor  
Licence  
ELIXIR Node

Home / Materials

Date Added  
Anytime

Scientific topic  
Metabolomics 4  
Chemical biology 1  
Microarray experiment 1  
Protein interactions 1  
Proteomics 1

Tool  
BridgeDbR 1  
PathVisio 1

Target audience

Subscribe

What are materials in TeSS?

metabolomics

19 materials found  
Search query: metabolomics


Informatics and Statistics for Metabolomics 2018 Module 6-Future of Metabolomics  
Course covers many topics ranging from understanding metabolomics technologies, data collection and analysis, using pathway databases, performing pathway analysis, conducting univariate and multivariate statistics, working with metabolomics databases, and exploring chemical databases.

Informatics and Statistics for Metabolomics 2018 Module 5-MetaboAnalyst

# Training as a service for Nodes - Training Toolkit






Collection of resources - developing, delivering, and evaluating training

## How to:

- design and implement training courses for **different audiences & domains**
- make training **Findable, Interoperable** using the  **Bioschemas** specifications
- design **learning paths** with competency frameworks & 'Knowledge, Skills and Abilities'
- collect feedback and determine the **quality and impact** of training activities
- build **training capacity** through the Train-the-Trainer program
- The training Toolkit is available for all training organizers & coordinators in the Nodes (and beyond)



# Ongoing projects

- Integration of ELIXIR Portals from users perspective (TeSS and )
- Workshop as a Service, Using clouds and VMs in bioinformatics training 
- Developing learning paths for users of ELIXIR services
- Towards Data Stewardship in ELIXIR: Training & Portal
- Training related to ELIXIR services/resources:  
BioSchemas, Beacons, CWL and biocontainers   
- Mapping the landscape of Biocuration in ELIXIR: Practice, capability and training requirements
- 2019: Implementation studies with Galaxy, Rare Diseases, Metabolomics Communities
- 2019: Training contributions in EOSCLife & in EJPRD



# ELIXIR Industry Strategy: Training

Ensure visibility and discoverability of ELIXIR training courses to industry, for example:

- Training events communicated through Industry mailing list, ELIXIR Events Portal and TeSS
- Ensure industry usage of TeSS for courses and materials (<https://tess.elixir-uk.org>)
- Work towards defining an ELIXIR certified training 'Quality stamp'

Perform gap analysis for training needs in industry:

- Survey industry partners in ELIXIR Member countries, using existing 'ELIXIR UK survey' as a basis and expanding to other countries
- Define the training needs (including scope, content, target audience(s) and format) in industry (e.g. using the Training platform survey) and use that to help guide ELIXIR's Training strategy

Improve the communication between training-related experts in industry and ELIXIR Training Platform:

- Communicate scope and vision of ELIXIR's training programme to industry
- Build a liaison system for effective communication including, for example, an e-mail list for industry researchers interested in training

Findability & Visibility:

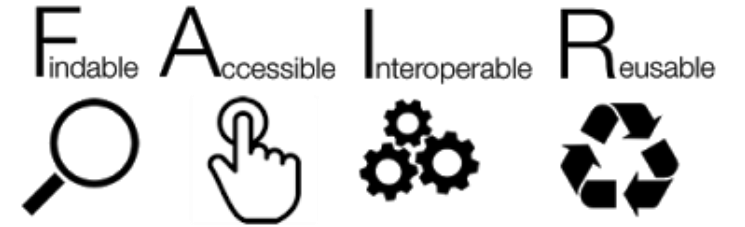
- TeSS
- ELIXIR Industry Newsletter

Industry training needs Surveys;  
Learning Path Implementation Study

Liaison Training Platform & Industry  
representatives



# ELIXIR & FAIR & Training



- Workshop - ELIXIR All-Hands meeting, June 2018

- Gathered over 30 participants



# ELIXIR FAIR Training – Working group

- Subtask: FAIR Training events & materials – Leyla Garcia (ELIXIR-UK) and Berenice Batut (ELIXIR-DE)
  - What FAIR principles mean in this case
  - How to assess FAIRness
  - Metrics to assess FAIRness; collaborating with FAIRmetrics team (Michel Dumontier, [www.fairmetrics.org](http://www.fairmetrics.org))
  - Recent session at BioHackathon Paris Nov 2018:
    - (i) evaluating FAIR metrics in the context of training
    - (ii) evaluating training materials with the metrics
    - (iii) finalised bioschemas descriptions for training



# ELIXIR FAIR Training – Working group

- Subtask: Training on FAIR principles – Mateusz Kuzak (ELIXIR-NL) & Fotis Psomopoulos (ELIXIR-GR)
  - Detail current materials and curricula and how to complement it
  - Define what is unique to ELIXIR
  - Avoid reinventing the wheel - collaborate
  - How to teach FAIR principles
  - Ensure all is Findable in TeSS



# Training in FAIR principles – to whom

Skills and competencies for:

- **Researchers:** create, manage and share FAIR data
- **Trainers:** teach and apply FAIR principles
- **Data Stewards:** provide support for research teams, data repositories, data services
- **Reviewers:** assess FAIRification of datasets, data resources in publications, grant proposal and reports



# Training in FAIR principles – some examples

- BYOD: FAIRify datasets, combine FAIR datasets
- Carpentry style FAIR training – teach recognized FAIRification processes – GO Train Implementation network
- Defining competencies and building training - Data Steward in Life Sciences



# ELIXIR & Data Stewardship (DS)



**Data Stewardship** is the responsible planning and executing of all actions on digital data before, during and after a research project, with the aim of optimizing the usability, reusability and reproducibility of the resulting data





# DM/DS skills are needed but there are challenges

- Skills in data management (DM) & data stewardship (DS) are crucial to deal properly with the data
- From EOSC High Level Expert Group, Oct 2016:
  - “There is an alarming shortage of data experts both globally and in the European Union”
  - “Core data experts need to be trained and their career perspective significantly improved”

## Challenges:

- Who to train? Which target audiences?
- What are the skills needed for each specific target audience?
  - For *researchers*: Crucial for research but not everyday practice (yet) and very demanding
  - For *Data Stewards*: In high demand, Upskilling needed, Skills profile currently being defined



# Towards Data Stewardship in ELIXIR: Training and Portal

- **Aim of the Implementation Study**
  - Bundle and effectively expose existing expertise on DM/DS in ELIXIR
  - Formulate, build and implement first solutions for good DM/DS in ELIXIR
- **Tasks in the project**
  - Task 1: ELIXIR Data Management and Data Stewardship (DM/DS) Training Needs and Activities
  - Task 2: A Data Stewardship Portal
- In line with ELIXIR strategic objective: “Develop a plan that connect the national data management programmes, advanced user support and training in ELIXIR Nodes to ELIXIR's federated data ecosystem together with monitoring of jointly agreed indicators of use and impact”
- ELIXIR Nodes involved: NL, CZ, LU, SI (and many others in kind)
  - In connection with ELIXIR DMP Working Group



# Task 1: ELIXIR Data Management and Data Stewardship (DM/DS) Training Needs and Activities

- Content of task:
  - Inventory of the ELIXIR DM/DS training landscape
  - Scoping, training needs and gap analysis
  - Development of ELIXIR DM/DS training
  - Run ELIXIR DM/DS courses
- We started with looking at competences needed to acquire
  - Organised around research data life cycle
  - Build on existing work (inside and outside Life Sciences & inside and outside ELIXIR)
  - After this: build modular and reusable training material and run courses



# Data Steward Competencies - Generic vs Life Sciences (LS) Domain

- Generic

- EU:
  - **EDISON** (<http://edison-project.eu/>)
  - **EOSCPilot** WP7 (<https://eoscpilot.eu/media/deliverables>)
- NL: **LCRDM**
  - Working alongside the LS domain work (ZonMw project)



- Life sciences domain

- **ELIXIR:**
  - Implementation study DM/DS: ELIXIR-NL, -CZ, - LU, - SI
  - Implementation study Learning Paths: ELIXIR- BE is leading the DM/DS use case
- **NL:** ZonMw funded project “Towards FAIR Data Steward as profession for the Life Sciences”



**ZonMw**



# Towards FAIR Data Steward as profession for the Life Sciences

- A collaborative approach built on existing expertise, in order to increase the quality and capacity of data stewards for life sciences
- Aim: professionalise the data steward function within the life-sciences domain, with a special focus on implementation of the FAIR principles and endorsed by all stakeholders in NL
- Funded by ZonMw plus inkind contribution of the project partners

**Radboudumc**

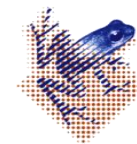
**Radboud University**



**UMC Utrecht**



**ZonMw**



**umcg**





# Towards FAIR Data Steward as profession for the Life Sciences

## Deliverable 1:

- Job profile/Role description for two levels of Data Stewards;
  - Institute /organization level
  - Project level
- endorsed by all stakeholders in NL
- ultimate goal: establishing function profiles in the NFU HR framework

## Activities:

- We analysed job vacancies and mapped with various existing frameworks (EDISON, DAMA, Purdue, EOSCpilot)
- Version 1 of the role descriptions have been reviewed by stakeholders in Nov 2018.

# Towards FAIR Data Steward as profession for the Life Sciences

- Next steps:
  - Next version of descriptions will be available for external use and review  
January 2019

- Attaching knowledge base and skills to these role descriptions for the two DS roles

- Design dedicated trainings & roll out 2 f2f trainings

- Make script for elearning trajectory

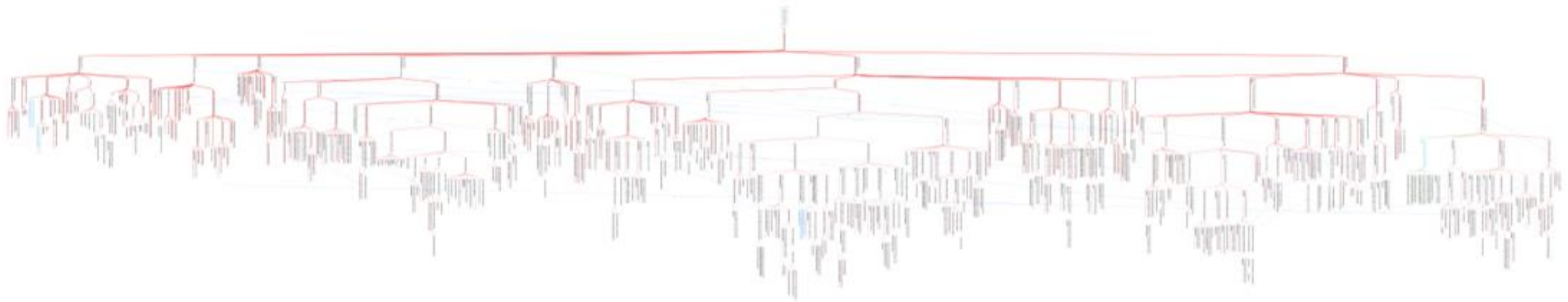
- Align and join forces with ELXIR Implementation Study activities

**Data steward Level A - Institutional, coordinating, policy**

	Responsibilities	Activities / tasks	Mappings (see below for reference)				
			Research data life cycle	FAIR data	Purdue compliance	DAMA knowledge	
1) Policy / strategy	Responsible for the development, implementation and monitoring of a research data management policy and strategy for the research institute, which includes the complete research data life cycle and supports FAIR data and Open Science, in alignment with the relevant stakeholders within the institute and in the context of the institute	Develops, implements and monitors the research institutes research data management policy. Advises the institute's management on short- and long-term actions to advance research data management in the institute. Assesses and monitors institute's time and financial investments in relation to the institute's needs for research data management. Explores new needs, opportunities and trends in research data management. Analyze faculty needs for data management; Identify support service gaps and design strategies to fill them; Advise faculty on internal and external developments in data management.	① ② ③ ④ ⑤ ⑥	FAIR	③ ④ ⑤ ⑥	① ② ③ ④ ⑤ ⑥	
2) Compliance	Responsible for compliance of the research data management policy to the Netherlands Code of Conduct for Academic Practice and the General Data Protection Regulation, as well as continuous alignment with legal and ethical standards.	Ensures compatibility of the research data management policy and monitors compliance. Contacts the institute's Privacy Officer, legal advisors or ethical board in case of questions regarding compliance	① ② ③ ④ ⑤ ⑥	FAIR	③ ④ ⑤ ⑥	① ② ③ ④ ⑤ ⑥	



# Data Stewardship Mind Map (Rob Hooft, DTL)



Mind Map is capturing the questions of all experts involved in DS;  
it is formalized into a **knowledge model** and is implemented in the DSW

Keep data

Is the Risk of information loss / theft acceptable?

Analyze chance and effect size

During measurement phase

In Analysis

Do people store data on computers in the lab?

Who has access to the labs?

Who has access to those computers?

Do people have data on external hard drives?

Is there any data on USB sticks people carry?

Encrypted?

Is any data on laptops?

Are they encrypted?

Is the laptop password protected?

Are researchers using cloud accounts?

Consider encryption

Are reports sent over e-mail?

Consider encryption

Do people share accounts?

Do the data centers where data is stored have Certifications?

Security for hosting

Are all internal web services used via https?

Did you run pilots to see what the capacity

# The ELIXIR Data Stewardship Wizard (DSW)

“Smart Data Management for FAIR Open Science  
For serious researchers and data stewards”

The Wizard is for:

- **Researchers:**
  - Support in DS Planning
  - Raise awareness
- **Data Stewards:**
  - Checklist DS Planning
- **Experts:**
  - Their contact details can be linked;
  - Allows tailor made DSW instances for an organisation, a Node etc.
- **Funders / Institutes:**
  - Customize, Domain specific



<https://dsw.fairdata.solutions>



# The ELIXIR Data Stewardship Wizard (DSW)

- The knowledge model is used by the DSW to display a questionnaire
- It opens relevant questions (only)
- It contains more detailed guidance on some topics
- It contains links to Barend Mons book pages(Data Stewardship for Discovery)
- It measures the FAIRness of the result per chapter

## Ongoing activities:

- It will contain links to course information / TeSS / EeLP / FAIRsharing/ bio.tools (hackathon Dec 2018)
- Collaborations
  - with funders (ZonMw) - they want to easily and objectively quantify the FAIR metrics of DMPs.
  - with company DSM – wan to run their local copy of DSW



<https://dsw.fairdata.solutions>

DSW Team:

- Robert Pergl, Marek Suchánek, Jan Slifka, Vojtěch Knaisl (ELIXIR-CZ)
- Rob Hooft, Mateusz Kuzak (ELIXIR-NL)



Today there will be a training workshop about the DSW.  
Please try the DSW and give us your feedback!!




[Data design and planning](#)[Data Capture/Measurement](#)[Data processing and  
curation](#)[Data integration](#)[Data interpretation](#)[Information and insight](#)

## Design of experiment

Before you decide to embark on any new study, it is nowadays good practice to consider all options to keep the data generation part of your study as limited as possible. It is not because we can generate massive amounts of data that we always need to do so. Creating data with public money is bringing with it the responsibility to treat those data well and (if potentially useful) make them available for re-use by others.


### Is there any pre-existing data?

Are there any data sets available in the world that are relevant to your planned research?

- ☐ No
- ☒ Yes 

### Will you be using any pre-existing data (including other people's data)?

Will you be referring to any earlier measured data, reference data, or data that should be mined from existing literature? Your own data as well as data from others?

- ☐ No
- ☒ Yes 

### What reference data will you use?





D

### What data formats/types will you be using?

Have you identified types of data that you will use that are used by others too? Some types of data (e.g. genetic variants in the life sciences) are used by many different projects. For such data, often common standards exist that help to make these data reusable. Are you using such common data formats?

Item

Is this a standard data format used by others too?

- ☐ No
- ☐ Yes

Does this data format enable sharing and long term archiving?

Complicated (binary) file formats tend to change over time, and software may not stay compatible with older versions. Also, some formats hamper long term usability by making use of patents or being hampered by restrictive licensing

- ☐ No
- ☐ Yes

Does this data format enable sharing and long term archiving?

Complicated (binary) file formats tend to change over time, and software may not stay compatible with older versions. Also, some formats hamper long term usability by making use of patents or being hampered by restrictive licensing

- ☒ No
- ☐ Yes

Will you convert to a file format more suitable for archiving later?

- ☐ No
- ☒ Yes

You may need to reserve time and budget for this





# DSW related Trainings & Workshops - Past

- **ELIXIR AHM2017** - ELIXIR-CHARME Workshop 'FAIR Data and Data Stewardship in ELIXIR: How to write your own FAIRy tale (by Interoperability & Training Platform)
- **EBI webinar** Rob Hooft July 2018 - "Tools for data management planning" (in EBI series): <https://www.ebi.ac.uk/training/events/2018/bringing-data-life-data-management-biomolecular-sciences>
- Workshop/hands-on **ECCB 2018 Athens** - "Implementation of Data Management Plans & Data Stewardship in practice"; Materials: <https://elixir.mf.uni-lj.si/course/view.php?id=40>
- **NETTAB 2018 Genova** - "The ELIXIR Data Stewardship Wizard – how to guide life science researchers towards FAIR data management"; workshop/hackaton on DSW contents



# DSW & DS/DM Trainings & Workshops - Upcoming

- **ELIXIR-CZ Annual Conference** , Nov 2018
  - Training DSW by Robert Pergl (ELIXIR-CZ)
- **DSW: specialised workshops:**
  - Workshops/hackatons for power users and contributors;
    - Connecting TeSS, FAIRsharing and EeLP to DSW. December 2018 in CZ.
  - Workshop for service providers; for those who want to deploy their local instance of Wizard e.g. for their own organization or institute; In 2019
- **DS/DM Training workshops**
  - 3 workshops; in 2019
  - Aligning with ZonMw trainings



# Final thoughts

- ELIXIR Training Programme is shaped and implemented by and for the ELIXIR Nodes
- It is a community effort, we have to build and sustain the training portfolio together by combining expertise and manpower
  - Join ELIXIR Training projects, implementation studies, working groups!
- Nodes can benefit from the ELIXIR Training Infrastructure and the Training Toolkit
  - Please add your trainings to TeSS. This can be automated!
  - Make sure for the trainings you do to capture the feedback through the ELIXIR surveys
- Contact the Training Platform for more information:  
[training-exco@elixir-europe.org](mailto:training-exco@elixir-europe.org)



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