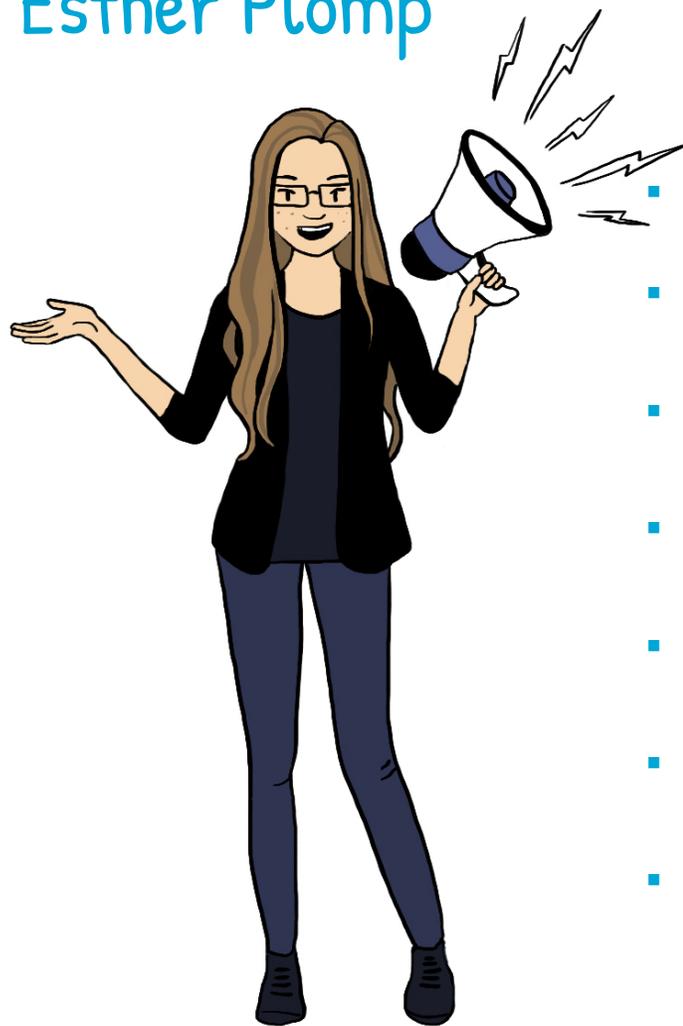


Research integrity starts with responsible  
Research Data Management:  
FAIR/Open Data at the TU Delft

<https://doi.org/10.5281/zenodo.6558216> CC-BY Esther Plomp / 20220518

# Esther Plomp



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- Contributor @[The Turing Way](https://www.theturingway.com)
- Mentor @[Open Life Science](https://www.openlifescience.org)
- Team member @[Open Research Calendar](https://www.openresearchcalendar.org)
- Co-chair of a [Research Data Alliance Group on Physical Samples](https://www.researchdataalliance.org)



# Why research data management?

# 2021 Majorana – Retraction

## Quantum computing's reproducibility crisis: Majorana fermions

Sergey Frolov

The controversy over Majorana particles is eroding confidence in the field. More accountability and openness are needed – from authors, reviewers and journal editors.

most developed approach, researchers must first grow a nanowire crystal – a feat in itself – to produce a column of atoms 100 nanometres (one-thousandth the width of a human hair) across. Then they must connect the wire to a circuit sensitive enough to measure single electrons travelling through it. The whole experiment must be done at about one-hundredth of a degree above absolute zero, in a magnetic field 10,000 times that of Earth's.

<https://doi.org/10.1038/d41586-021-00954-8>

See also: [About our Majorana fermion paper](#)

- [Microsoft-Led Team Retracts Disputed Quantum-Computing Paper](#)
- [Another setback for 'Majorana'](#)

## Authors retract Nature Majorana paper, apologize for “insufficient scientific rigour”



Leo Kouwenhoven, [credit De Sebastiaan ter Burg](#)

<https://retractionwatch.com/2021/03/08/authors-retract-nature-majorana-paper-apologize-for-insufficient-scientific-rigour/>

## Majorana – Why Open Data?

- Investigation by experts:
  - **Authors selected data** that supported the phenomenon they were looking for
  - **Authors omitted data** that could have raised questions about the conclusions
- “It is a good thing that **independent experts have looked at this as part of the integrity investigation**,” says Tim van der Hagen, Rector Magnificus of TU Delft. “Science always involves **looking critically at results**, questioning and challenging them.”

[Source](#)

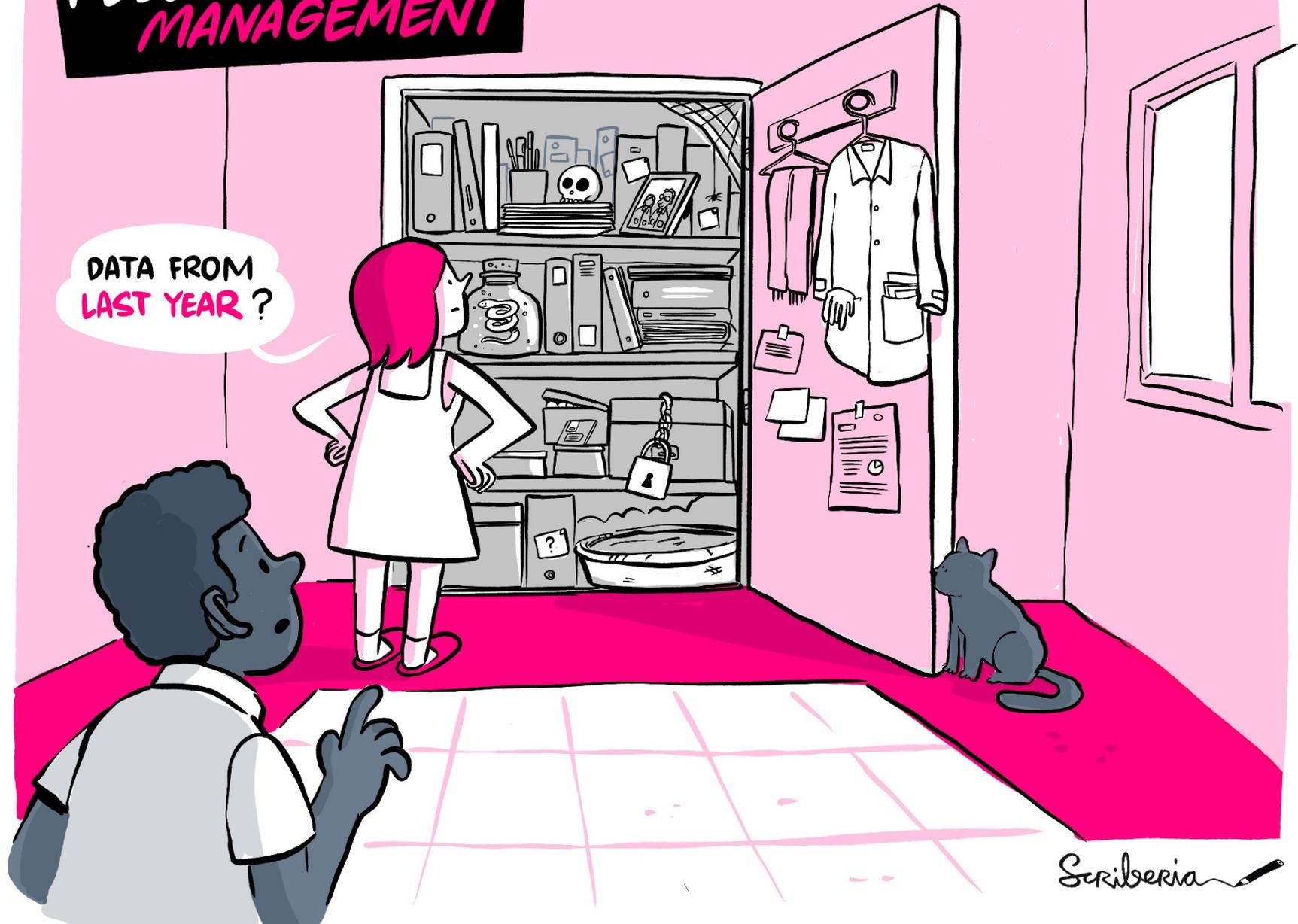
Science always involves looking critically at results –  
requires Open Science (data, software, methods)

Science always involves looking critically at results –  
requires Open Science (data, software, methods)

But how?

# RESEARCH DATA MANAGEMENT

DATA FROM  
LAST YEAR?



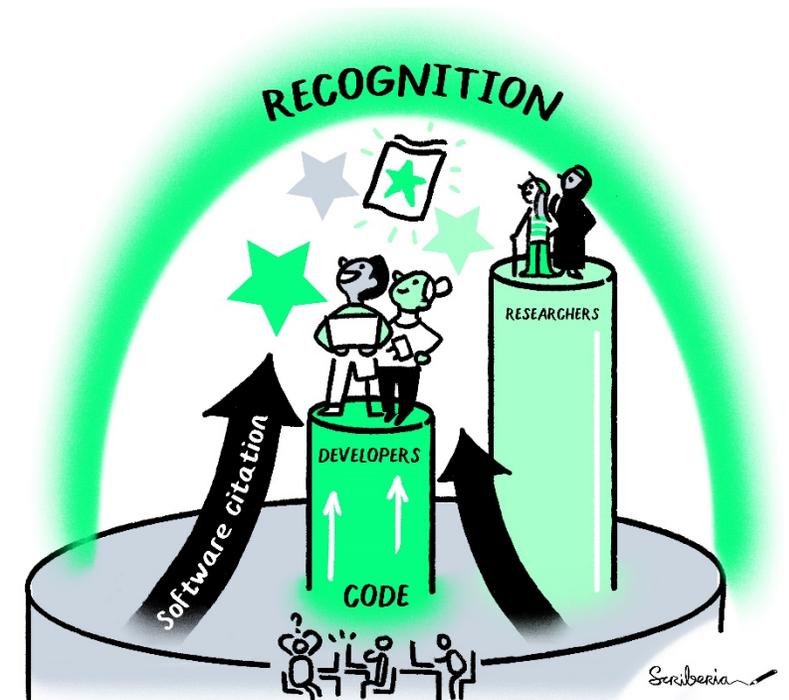
Scriberia

The Turing Way project  
illustration by Scriberia.  
Used under a CC-BY 4.0  
licence. DOI:  
[10.5281/zenodo.3332807](https://doi.org/10.5281/zenodo.3332807).

# Research data management – benefits!

- In compliance with national/funding requirements
- Prevent data loss/unfindable files
- Can you still use data when people leave?
- Recognition for all research outputs
- Facilitates collaboration
- Increases quality of scientific practice
- Cost/time efficient
- No paper retractions!

The Turing Way project  
illustration by Scriberia.  
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licence. DOI:  
[10.5281/zenodo.3332807](https://doi.org/10.5281/zenodo.3332807).



# TU Delft approach to Research Data Management

# Research data management @TU Delft

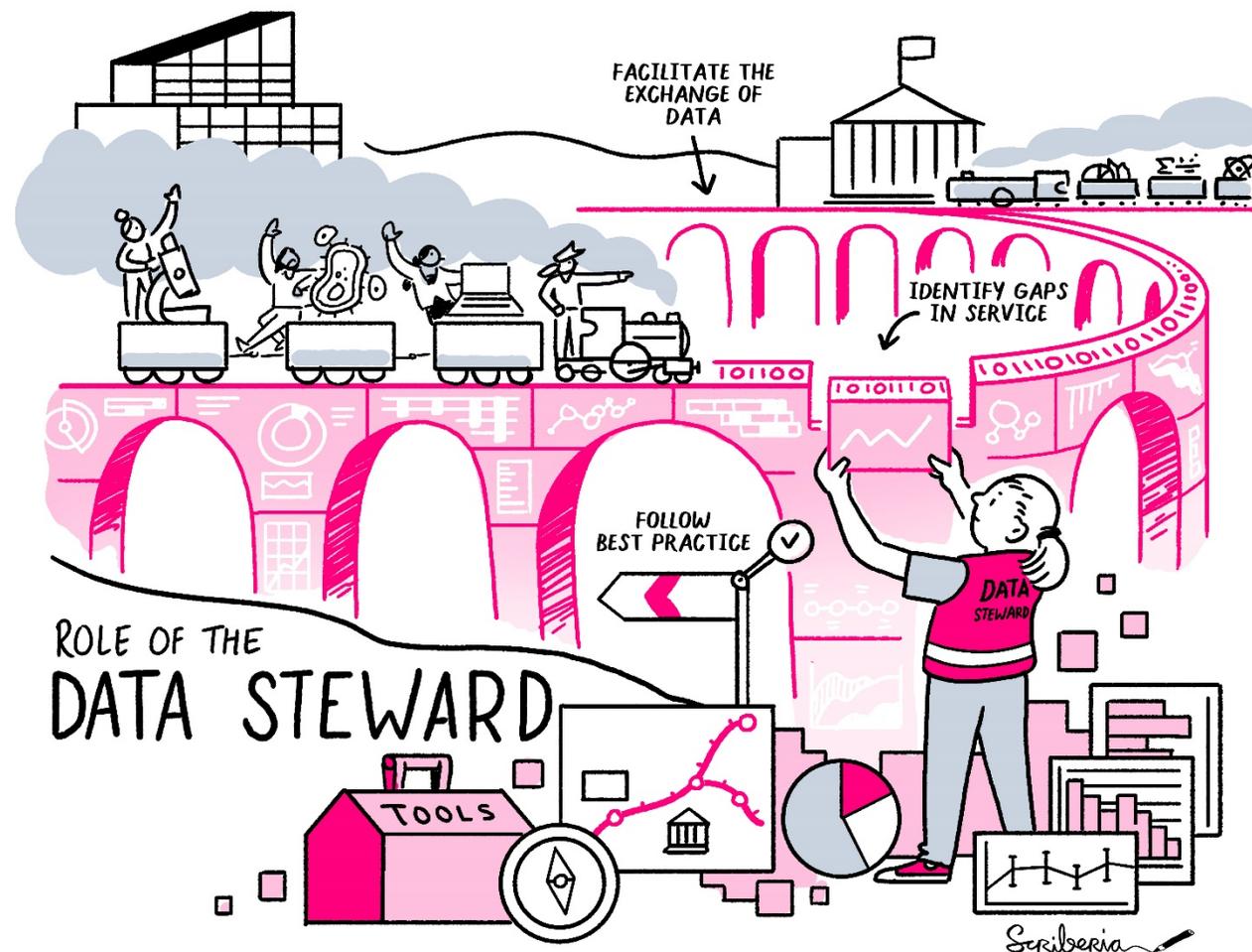


- Support from the TU Delft CvB/Executive Board: researchers need training/tools to manage/share data
- Led to the **Data Stewardship project** from 2018-2020
  - Each faculty has their own Data Steward!

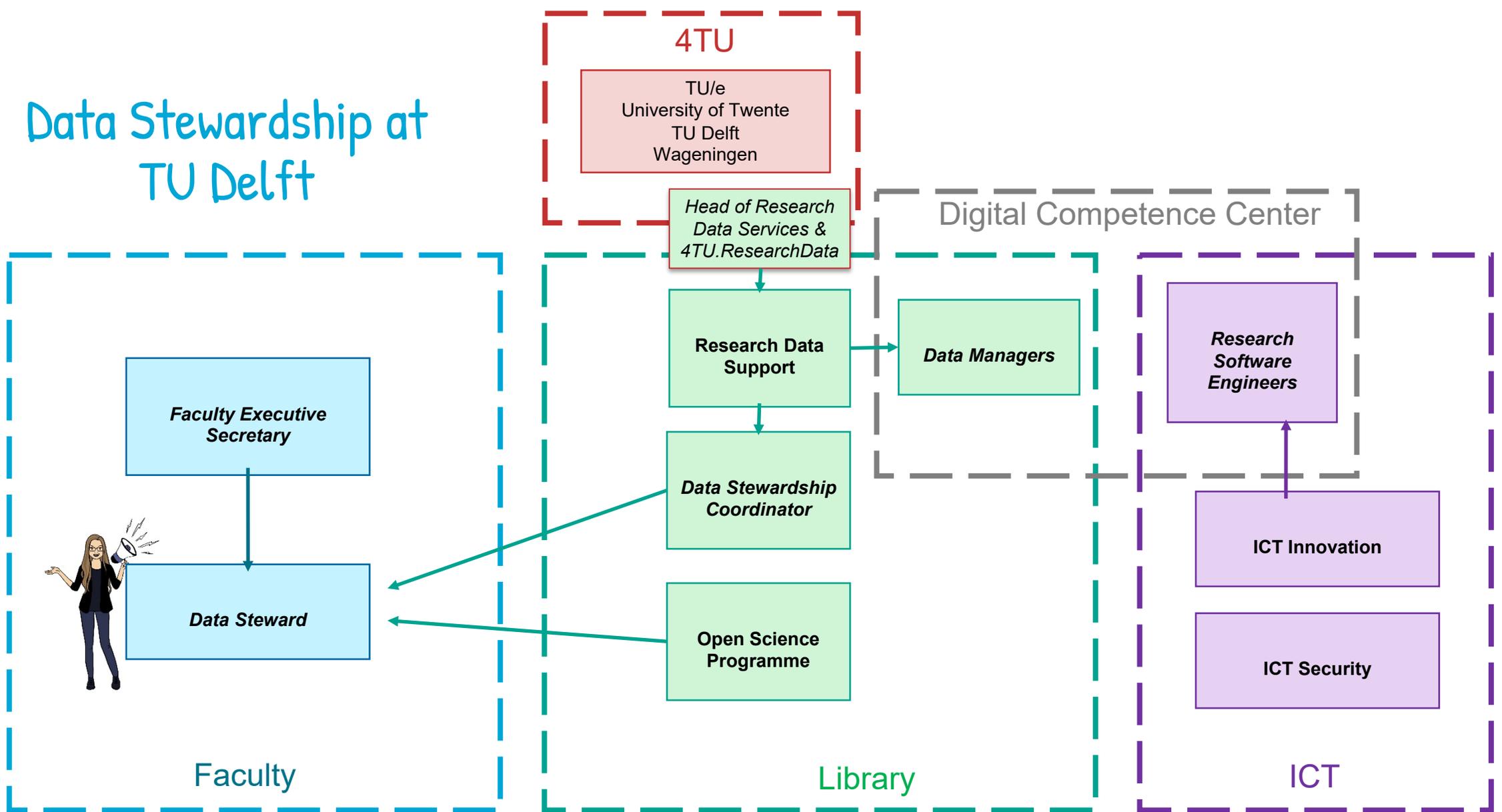


## Data Stewards @ TU Delft

- **First contact point** for all data/software/open science questions (advice!)
- **Policy** development
- **Advocacy**
- **Training**
- **Network**: referral to other staff as needed

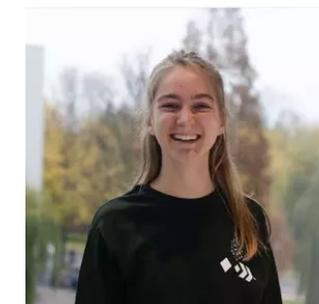
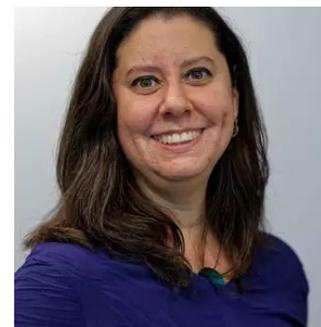


# Data Stewardship at TU Delft



# RDM support @Library

- [Website](#)
- Electronic Lab Notebooks
- Data repository: [4TU.ResearchData](#)
- Training
- Communication
- Events
- (inter)national developments



Research and Education in the Open Era

# TU Delft Strategic Plan Open Science 2020-2024

## Open Science Programme

- [TU Delft Strategic Plan Open Science 2020-2024](#)
- [TU Delft Open Science Programme 2020-2024 Research and Education in the Open Era](#)
- [Website](#)

# Digital Competence Center (since 2020)

- The DCC support team can [help you organize your research workflow](#)
- Project based data & software support
  - Up to 2 days per week for 6 months or smaller requests that are under 30 hours
  - 2 x Data Managers + 4 x Research Software Engineer



Marta Teperek  
Library RDS



Mark Schenk  
ICT Innovation



Ashley Cryan  
Data Manager



Aleksandra Wilczynska  
Data Manager



Dennis Palagin  
DHPC Data steward



Meta Keijzer-de Ruijter  
Project Manager



Julie Beardsell  
DCC Coordinator



Niket Agrawal  
RSE



Manuel Garcia Alvarez  
RSE



Maurits Kok  
RSE



Jose Urria Llanusa  
RSE

# Research Data Management Policy – TU Delft

2018, 2020

## **TU Delft Research Data Framework Policy**

- Roles and responsibilities at the university level
  - Several compulsory statements
  - Template for faculties



2020-2022

## **Faculty Policies**

- Roles and responsibilities at the faculty level
  - Reflecting disciplinary differences

# Research Data Management Policy – MTU

[Research Data Management Policy](#), March 2022

- In cases where **research is funded by a third party**, any agreements made with that party concerning intellectual property rights, access rights and the storage of research data may take precedence over this policy, as per the *Code of Good Practice in Research*.
- **Principle Investigators are primarily responsible** for research data management
- In **line with the FAIR principles** ... allows for the verification, reproducibility and digital preservation of findings; fundamental to high quality research outputs and research integrity.
- **All new research proposals should include a research data management plan (DMP)**
- Research data should be made available under an **open licence ([data](#) / [software](#))**

# FAIR

## Findable

Descriptive metadata and persistent identifier

## Accessible

Data could be openly available OR authentication and authorisation procedures are necessary

## Interoperable

Data needs to be integrated with other data and interoperate with applications or workflows.

## Reusable

Documentation and license

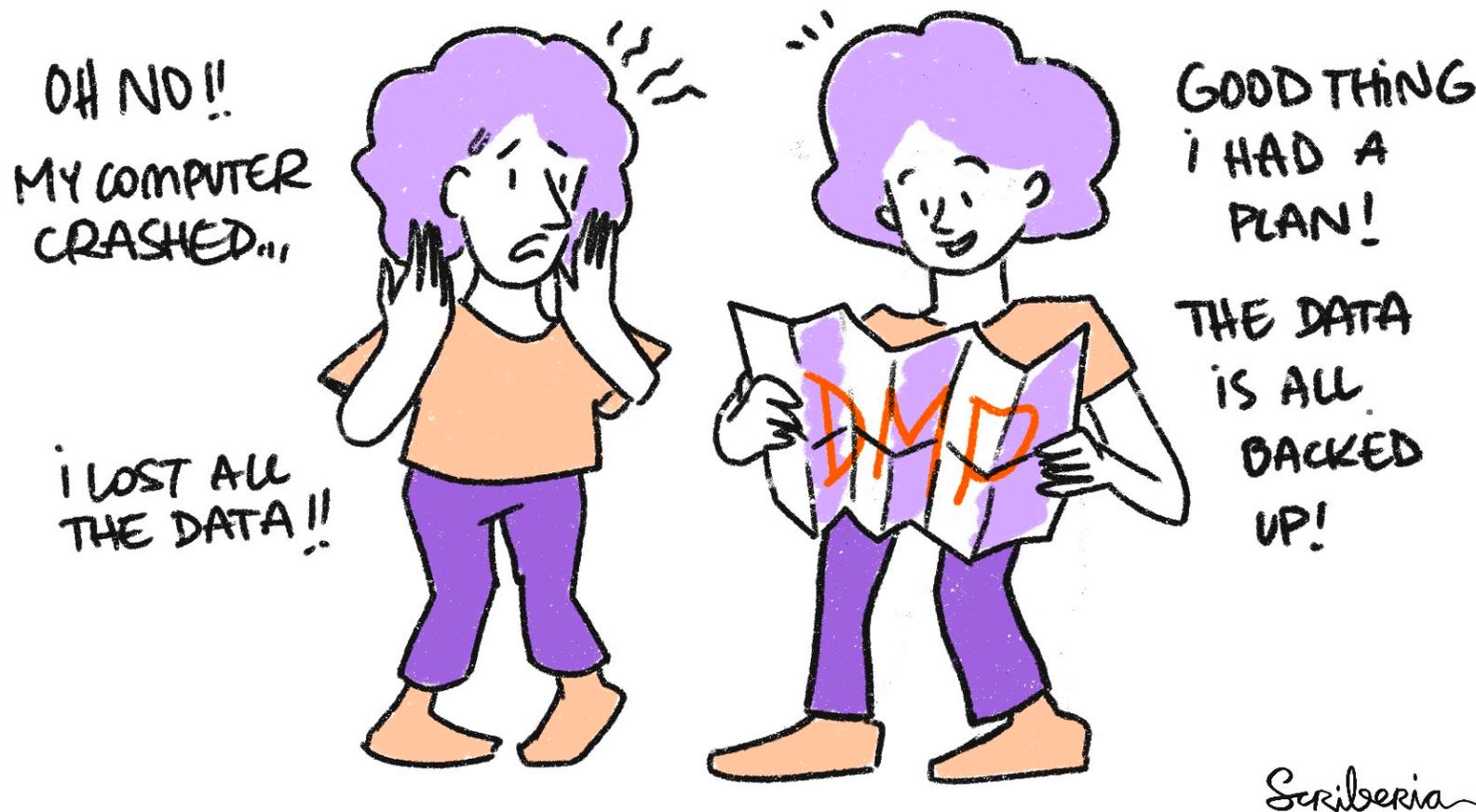


Scriberia 



# Data Management Plan

- Document that describes **how your research outputs will be generated, stored, used and shared** within your project
- A **roadmap** for you to manage your data efficiently and securely
- More information on [The Turing Way](https://doi.org/10.5281/zenodo.6558216)



# How? TU Delft training and resources

# Training @TU Delft

- [Software/Data Carpentry workshops](#) (Library, Data Stewards, Digital Competence Center, ICT Innovation, Researchers)
  - see [Plomp et al. 2022](#) for more info
- [Research Data Management 101 course](#) (Library)
- Working with personal research data (in development – Library, Data Stewards)
- On-demand training (Data Stewards, Digital Competence Center, Researchers)
- [Essentials for Data Support](#) (4TU.ResearchData/Library)
- [Open Science MOOC](#) (Library, Researchers)
- [Open Life Science](#) (Data Stewards & Digital Competence Center)



# Open Life Science

- **Open Science** (not just life sciences!)
- Training and mentoring programme (16 weeks)
- Credits for PhD candidates from TNW
- Learners will be introduced to **Open Science terms and principles** and will learn how to apply those principles through working openly in their projects and discipline specific communities
- TU Delft Library staff is involved with the programme!
- **You can join** the sixth cohort (September)!
- <https://openlifesci.org/>



Multibeam electron microscopy for imaging large tissue volumes

By:  [Arent Kievits](#)

Increasing the usability of ChemSpaX, a Python tool for chemical space exploration

By:  [Adarsh Kalikadien](#)

Build a community around the TU Delft Open Science MOOC

By:  [Alessandra Candian](#),  [Lisanne Walma](#)

Publishing development plan for the Open access journals of TU Delft OPEN Publishing

By:  [Frédérique Belliard](#)

# Software/Data Carpentry Workshops

- <https://software-carpentry.org/>

## Lesson

The Unix Shell

Version Control with Git

Programming with Python

Plotting and Programming in Python

Programming with R

R for Reproducible Scientific Analysis

- <https://datacarpentry.org/>

## Curriculum materials

- [Astronomy curriculum](#)
- [Ecology curriculum](#)
- [Genomics curriculum](#)
- [Geospatial data curriculum](#)
- [Social Sciences curriculum](#)



# Tools

- [DMPonline](#)
  - Create data management plans
  - Templates and guidance (storage solutions, example answers)
  - Webinar: [DMPonline: towards better efficiency](#)
- [Electronic Lab Notebooks](#)
  - Searchable, backed up notebooks that can be reused and shared more easily
- [4TU.ResearchData](#)
- [GitLab](#)
- [Website](#) with information and FAQ

# Research Data Management

Plan	Policies	Manage
Data management plans	TU Delft & Faculty Policies	The goal of data management
DMPonline	Funders' Policies	Storage
Grant Proposals	Publishers' Policies	Confidential Data
Data ownership		Collect and document
		Electronic Lab Notebook
Publish	Support	Training & Events
Prepare data for publication	Data Stewardship	Training for Researchers
Cite your data	Data Champions	Training for Support Staff
Publish research data	Digital Competence Centre	News & Events
Publish research software		
Licenses		
FAIR Data Fund		

# Templates for Research Grants

- [NWO/Horizon Europe](#)
  - CC-BY-SA 4.0

## Guidance Document for the Open Science & Research Data Management Sections of Horizon Europe Applications

TU Delft Data Stewards, Open Science Community Manager et al, August 2021

### Purpose of this Document:

This document provides **example answers** to help TU Delft researchers address the questions in Horizon Europe Programme Standard Application Form, Project proposal- Technical description (Part B) section 1.2 (“Open Science” and “Research data management and management of other research outputs”) sections.

This document complements the Information and Resources provided in the [Horizon Europe Programme Guide](#).

### Important Notes:

- In Part B, section 1.2 of your application, you should address open science specifically in your response to the following questions:
  - [Describe how appropriate open science practices are implemented as an integral part of the proposed methodology... \(in 0.5-1 page\)](#)
  - [Research data management and management of other research outputs \(1 page\)](#)
  - [Describe how the consortium brings together the necessary disciplinary and inter-disciplinary knowledge... \(in 0.5 page\)](#)
- In Horizon Europe, open science practices are considered in the evaluation of proposals, under “excellence” and under the “quality and efficiency of implementation”.
- This does NOT apply to the ERC programme where open science is not included in its evaluation.
- Exact wording varies between the HE application forms, but the gists are the same.

### Note from authors:

Open science practises vary between disciplines and are quickly evolving with time - any and all suggestions for improvement are very welcome. If you have questions, need support in answering the sections below, or have any suggestions and comments about this document, please contact the [Data Steward of your faculty](#).

# Blogs

- [Publishing a Data Article](#)
- [Managing and Sharing Data in 2021](#)
- [Quality is key](#)
- [Publishing articles in 2021](#)
- [Making software FAIR?](#)
  
- And more on [Open Working](#)



# Open Working

Open Working from 4TU.ResearchData & TU Delft Library (Since 2017)

# Open Science Community TU Delft

- The Open Science Community Delft (OSCD) is an **inclusive learning community** that focuses on sharing and promoting **Open Science** practices
- Part of the **broader network** of Open Science Communities: INOSC
  - The Netherlands, Galway, Sweden
- Open Science Community Starter Kit



Image by [Anita Eerland](#), licensed under [CC BY-ND 3.0](#).

## PhD newsletter @ TNW

- Started since the pandemic
- Items are organised per topic
- Older newsletters can be found on GitHub
- You can also sign up

## TNW-PhD-Newsletters

Overview of the newsletters sent to the PhD candidates of TNW by the [Data Steward](#). Below follow resources that have been sent out sorted on their main topic. If you're not a TNW/AS candidate you can sign up here: <https://ieV5VcGcGbJNMwN89>

### Data

- TU Delft resources
  - [DMPonline](#) to set up a data management plan (see also the [Research Data Management website](#))
  - TU Delft [Research Data Management 101 course](#)
  - [TNW/AS Research Data Management Policy](#)
  - Electronic Lab Notebooks: [RSpace](#) and [eLABjournal](#) are available for TU Delft researchers
  - [4TU.ResearchData](#) archive to share your data
  - [Project drive](#), [SURFdrive](#) or OneDrive to store your project's research data
- [Know Moore About Research Data Management](#) (+ slides - Some resources mentioned in the webinar)
- [The Turing Way](#) also has a chapter on [Research Data Management](#) - and a lot more information on reproducible.
- [Blogpost that contains some tips on how to organise your paperwork](#)
- Webinar: [Data licenses and management](#) (1:04-1:17)
- Aalto University's [Introduction to Research Data Management](#)
- Short video on [file formats](#)
- Organise your spreadsheet data with [OpenRefine](#)/[Frictionlessdata](#)/[Excelint](#) (see also [this lesson on Carpentries](#)).
- Podcast episode 'Reproducible data science, how hard can it be?'
- [ROpenSci webinar 'The Wild World of Data Repositories'](#)
- Learn more about Data Management Plans (DMP) by [watching a video on DMPs](#)
- file naming
  - Do you run into [New\\_Final\\_FINAL\\_NEW\\_23\\_FuckingFinal.jpeg](#) troubles? Have a look at [this preprint](#) or a [blogpost on how to make your files more findable](#).
  - Want to rename multiple files? The [Bulk Rename Utility](#) may save you a lot of time (but be careful). This [short data organisation/documentation manual](#) can help you with file naming but also for

# The Turing Way

- **The Turing Way project** is an open-source handbook and community that makes data science accessible, comprehensible and effective for everyone.
- Guide on **Reproducible Research**
  - Chapter on [Research Data Management](#) & [Open Research](#)
- [Images](#) that you can reuse under a CC-BY licence!
- You can join [this week's community share out](#), or other [community events](#)!
- [Subscribe to the newsletter](#) or [follow on Twitter](#)



## The Turing Way

🔍 Search this book...

Welcome

Guide for Reproducible Research ▼

Guide for Project Design ▼

Guide for Communication ▼

Guide for Collaboration ▼

Guide for Ethical Research ▼

Community Handbook ▼

Afterword ▼

“Science always involves **looking critically at results**, questioning and challenging them.” - Tim van der Hagen, Rector Magnificus of TU Delft.

We need **all the results**, not just the summary, available in an **understandable manner**.  
RDM/Open Science practices make this possible.

# There is support!

- University
- Communities

Open Life Science, The Turing Way, The Carpentries, Open Science

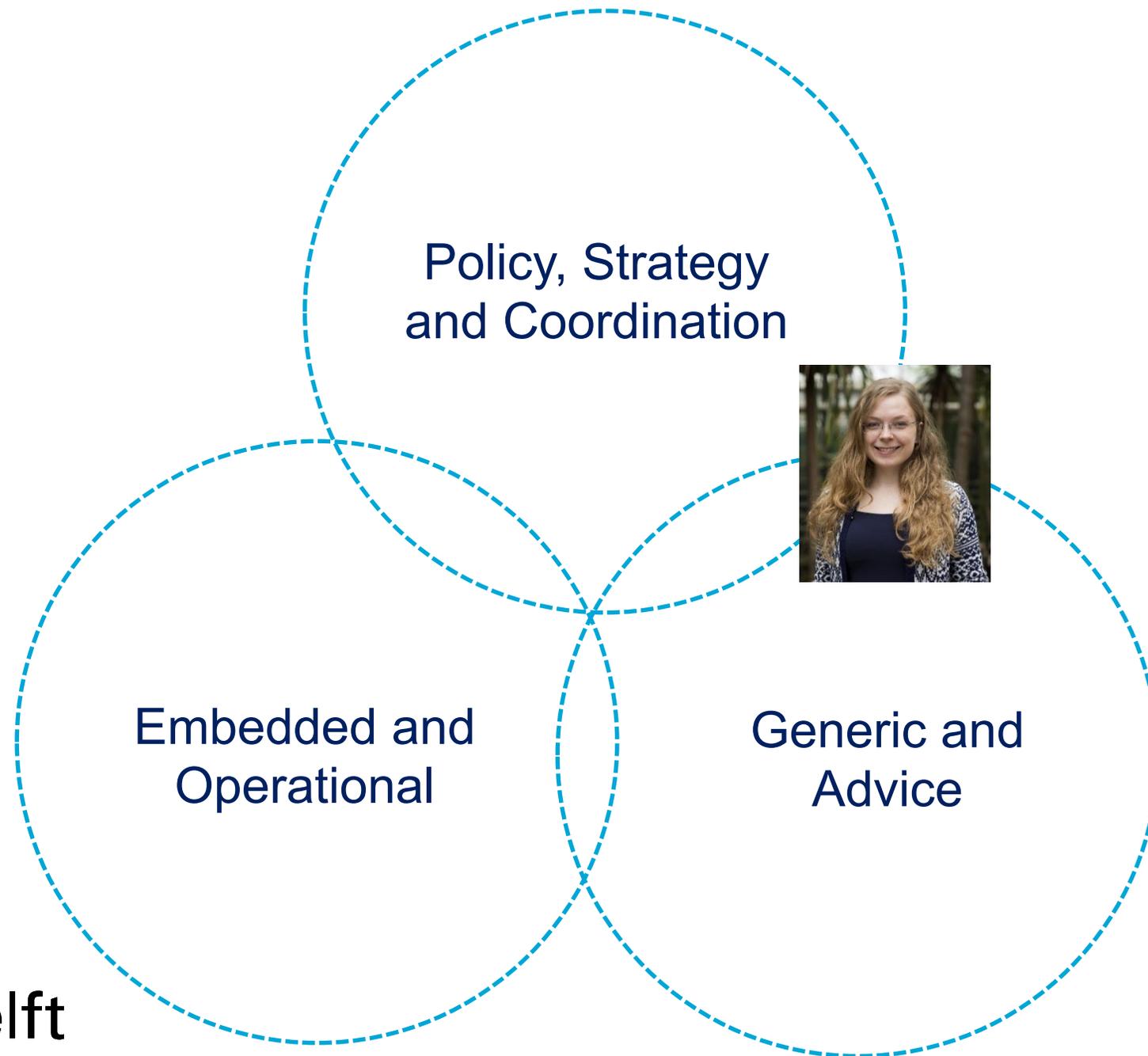


Thank you for your attention!

Esther Plomp, [e.plomp@tudelft.nl](mailto:e.plomp@tudelft.nl)

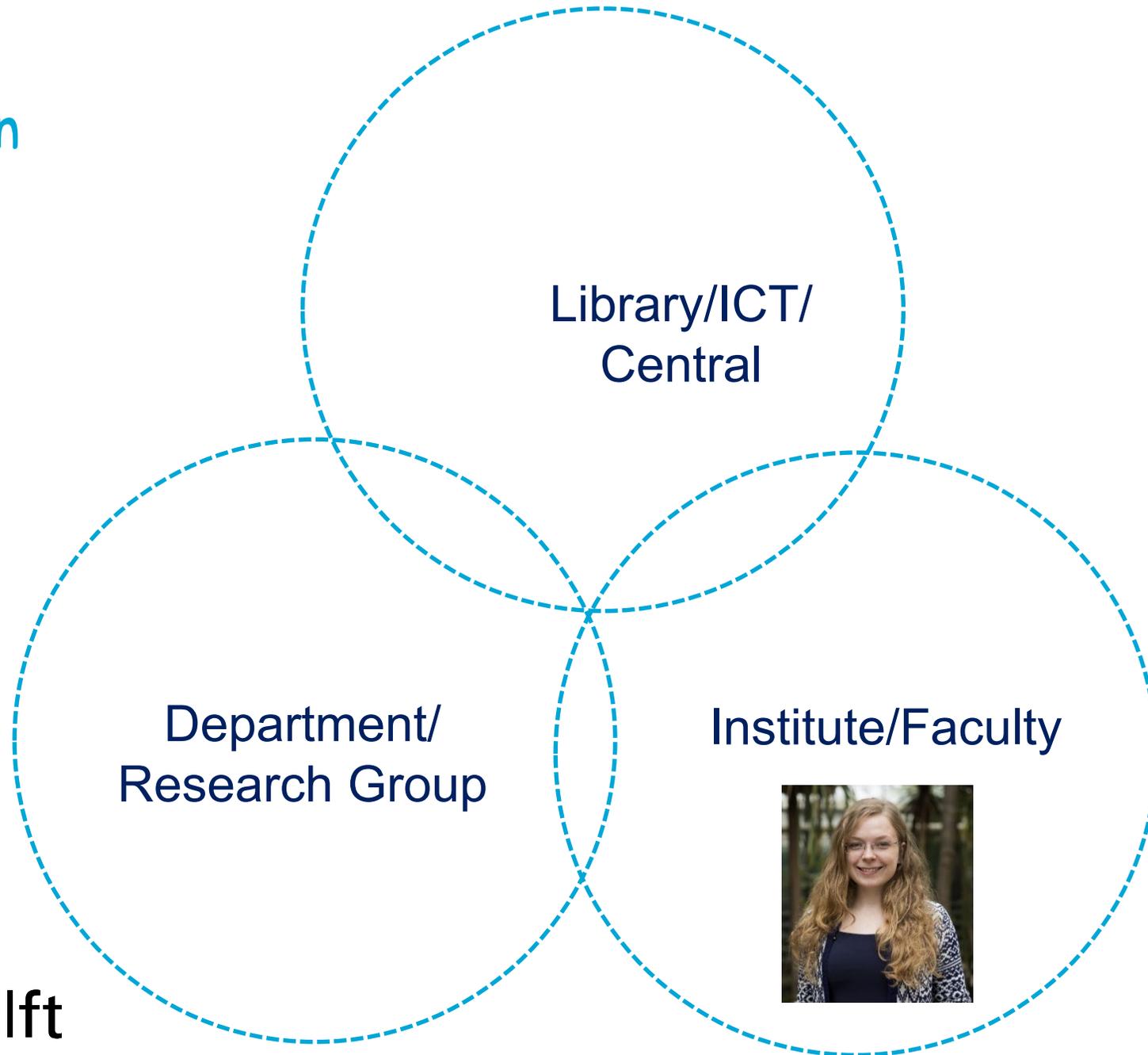
Many thanks to Paula Martinez Lavanchy for feedback  
on these slides.

# Tasks



*LCRDM data  
stewardship  
task areas*  
[10.5281/zenodo  
.4320504](https://doi.org/10.5281/zenodo.6558216)

# Location



# Related TU Delft policies

- [Policy on Open Access Publishing](#) (2016)
- [Research Data Policy Framework](#) (2019, 2021)
- [Research Software Policy](#) (2021)
- [Diversity & Inclusion Office](#) (2021)
- [Vision on Integrity 2018-2024](#)
- [Recognition & Rewards Perspective 2021 – 2024](#)