

Faculty of Applied Science and Open Science – A team: Overview 2021-2023

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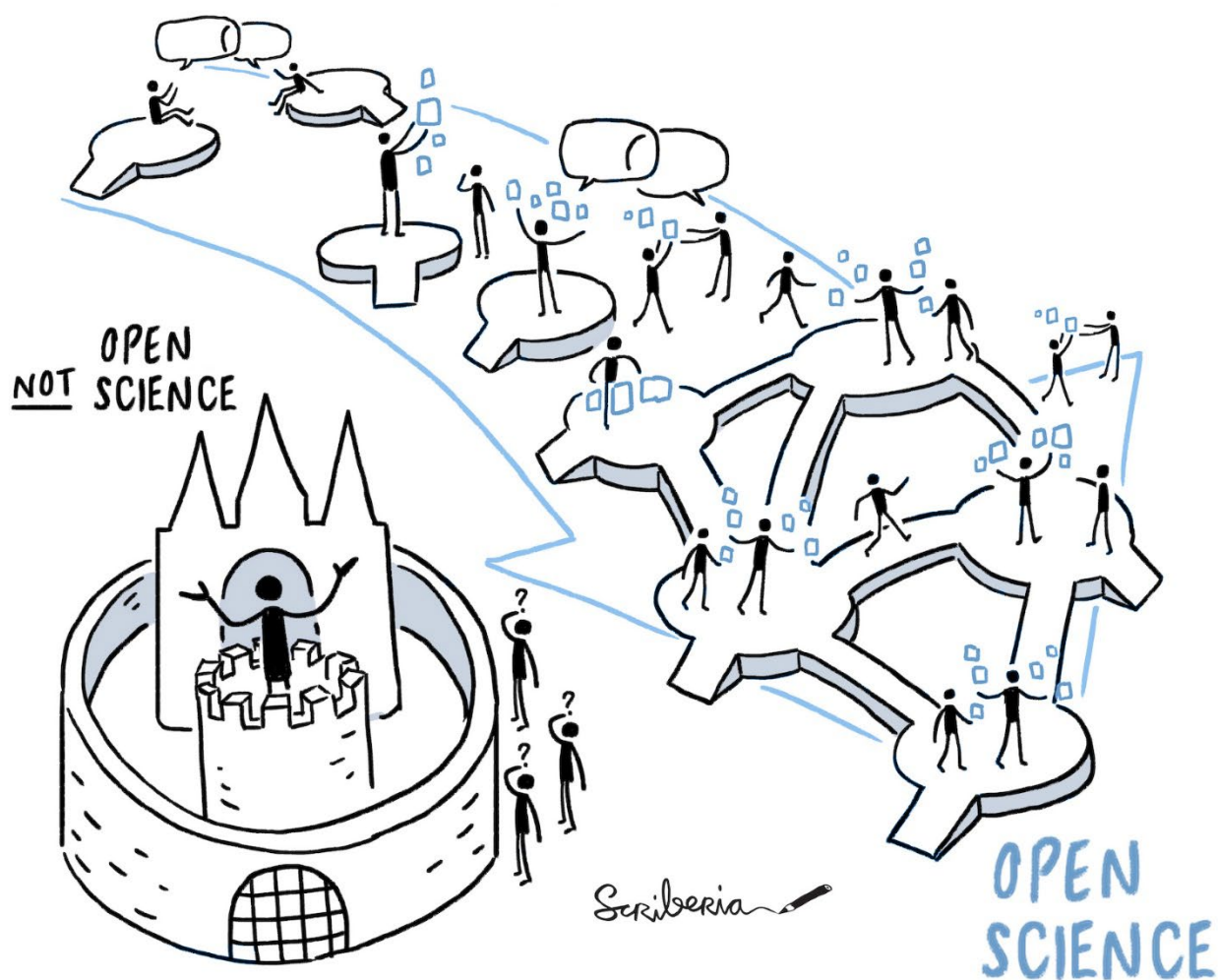


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Summary

The Faculty of Applied Sciences established its Open Science Team in 2021. Below the 1) goal and mission, 2) background information, and 3) discussion results are outlined. Based on the discussion results, 4) actions for the future are highlighted. Lastly, the 5) questionnaire and resources used during the process are provided.

1. Goal and mission

The aim of the Open Science Team is to increase awareness of Open Science and to gain insight of the requirements of Applied Sciences researchers so that they can more successfully engage with Open Science practices.

2. Background

The Applied Science Open Science Team (Team) had their first meeting on the 19th of April, after approval of the Faculty's management team on the 23rd of September 2021. The Team addresses the limited awareness of Open Science practises at the Faculty and highlight the support the Faculty and TU Delft already provides. The Team consists of at least one individual from each of the six departments. Next to departmental representation, diversity in background, position, and gender were taken into consideration. This resulted in a team consisting of the Faculty's Data Steward, two PhD candidates, four professors (two assistant, one associate, one full), and a department manager. The Team consisted of eight members in total (four women and four men).

Four Team meetings took place to set the goals of the Team, work on questions to ask departments, and to evaluate the results of departmental discussions.

- 19 April 2022: Introductions and goalsetting
- 7 June 2022: Discuss approaches and questions to ask
- 30 August 2022: Finalise survey/questionnaires
- 26 January 2023: Discuss results of the discussions and prepare meeting for Management Team

3. Summary of the departmental activities

The Open Science Team (Team) engaged each department in a discussion or via an online questionnaire. The engagement followed the preferences of the department and the Team member from this department (**Table 1**). The majority of the discussions took place in Faculty meetings (ImPhys, RST, ChemE, BT), where only Principal Investigators and the department management team are present. The results from QN and BN also include input from staff members other than PI's, as the QN department meeting is open to all staff and the BN Survey was distributed to all department members. The discussions from ChemE and QN meetings were more biased towards open data, research data management and software (QN) since the case studies/presentations were focusing on these topics.

Table 1: Overview of the departmental activities. Departments are listed in chronological order of engagement.

<i>Department</i>	<i>Time allotted</i>	<i>Format</i>	<i>Audience</i>
<i>ImPhys</i>	45 minutes	Presentation and discussion	PIs
<i>RST</i>	60 minutes	Presentation and discussion	PIs
<i>ChemE</i>	90 minutes	Case studies by department members, presentation and discussion	PIs
<i>QN</i>	30 minutes	Presentation (together with the Digital Competence Center) and discussion	PIs, Postdocs, PhD candidates, technicians
<i>BN</i>	10-15 minutes	Survey	PIs, Postdocs, PhD candidates, technicians
<i>BT</i>	30 minutes	Presentation and discussion	PIs

Key point of discussions: Open Science should serve a purpose and not be an end goal in itself.

Problems addressed by Open Science that were most chosen/mentioned are:

- Data not available (from published articles or within the institute when people leave)
- Article behind the paywall
- Insufficient information available to reproduce/reuse the results (method/protocol)
- Stop the waste of research efforts by facilitating publishing negative results
- When research can be validated it will increase trust in research
- Proprietary software that is unusable because TU Delft does not have a license
- Not sure whether materials can be reused (copyright)

The Open Science topics that were of most use:

- Open Publishing (open access, preprints etc)
- Open Data
- Open Software
- Open Methods
- Open Education
- Open Engagement (Science Communication)

Training or more information was preferred on the following topics:

- Preparing data/code for sharing/reuse
- Publishing the data and code underlying a paper
- Storing and long-term preservation of data and results
- Collaboration with industry (how do you efficiently navigate this?)
- What tools/information is already available?
- Licenses
- Data Management Plans

The **experienced challenges** are related to **data curation** and a **lack of time**. Other factors are: big data, unsure if people will reuse the data, and expensive open access fees. Expertise in research groups are difficult to maintain (with high turnover rates in research group members). Data sharing is considered to be more helpful when it is standardised but this takes effort and is not always possible.

The greatest barriers were **lack of experience/time**, and a **lack of guidelines** and recommendations. One researcher mentioned that there's a lack of vision or guidelines from the Faculty on this (what is expected from staff in terms of Open Science?). Lack of supporting infrastructures/research culture, funding and industry collaborations/proprietary software were also important. Not everyone was aware of the support and guidelines already available at the Faculty and TU Delft.

Main drivers are external (requirements by journals and TU Delft), but also intrinsic (because it is important and it has more impact).

Most of the **FAIR/Open Data discussions** touched upon what data should be shared: the underlying data or also the raw data? There is a division between researchers that think it is more helpful to share the raw data and those that prefer to share only the underlying data. This is likely caused by the barriers/concerns people have with sharing data mentioned above. The relation FAIR and Open Science can be better clarified. Other aspects related to open data were concerns about data security (is there any data that could be used for harm?) and sustainability questions (what are the environmental costs of data sharing?)

4. Future actions

The results from these discussions and survey indicate an interest in the subject and highlight the need to engage this topic more regularly in the future. This will improve the awareness of Open Science practices and existing solutions provided by TU Delft and our Faculty. The Open Science Team will therefore continue as an advisory think-tank and decide on which objectives to work in the upcoming year(s). Examples include:

- Involvement in (bi)annual department meetings and/or information sessions
- Guidelines or a toolkit/starting package on Open Science
- A one pager on what Open Science practices to consider in annual assessment meetings
- A document addressing the 5-10 most asked questions about Open Science
- Increasing awareness for existing initiatives (Data Champions/Open Science Community)
- Best practises for industrial collaborations.
- Considering how Open Science support can be further embedded at the department level

One of the major points of discussion was Open/FAIR data. A key issue is the question whether sharing processed data is sufficient, or whether the raw data should also be shared. To address this discussion a revision of the Faculty's Research Data Management Policy (focussing on the processed data) is needed. An updated policy should also more clearly define the relationship between FAIR data and Open Science, data security, and the sustainability of long-term data storage and sharing.

5. Questionnaire

[Direct link to the template for the questionnaire in Microsoft Forms.](#)

1. Position

- Principal Investigator
- Postdoctoral researcher
- PhD candidate
- Support staff / Technician
- Bachelor / Master student
- Other:

2. Please indicate your familiarity with the following Open Science topics (Unaware, Aware, Have experience, Not interested)

- Open Access
- Open Data
- Open Software
- Open Hardware
- Open Methods
- Open Education
- Preregistration
- Open Peer Review
- Citizen Science
- Preprints
- Science Communication/Public engagement

3. What problems do you experience which could be solved with Open Science practices?

- Article behind a paywall
- Data not available or not reusable
- Code unavailable or not working
- Insufficient information available to reproduce the results or to reuse the materials
- Proprietary software which I cannot use because I / TU Delft does not have a license
- Not sure whether I can reuse the materials (copyright)
- Laboratory equipment with restricted use due to proprietary software/hardware

4. Please rank the Open Science topics according to how useful they are to your research/field (see <https://estherplomp.github.io/TNW-OST-Survey/> for a list of definitions)

- Open Access
- Open Data
- Open Software
- Open Hardware
- Open Methods
- Open Education
- Preregistration
- Open Peer Review
- Citizen Science
- Preprints
- Science Communication/Public engagement

5. Who do you contact when you have questions about Open Science?

- I don't have any questions
- Colleagues
- Online search (Google, DuckDuck go, Stackoverflow, etc)
- Data Steward
- Data Champion
- Open Science Community members
- Library
- Digital Competence Center
- An Open Science contact at the department level would be helpful
- Supervisor / manager
- Scientific association/community
- Not sure
- Other:

6. What do you find challenging or not in practising Open Science? (Not challenging, Somewhat challenging, Neutral, Challenging, Very Challenging)

- Publishing a preprint
- Sharing data
- Sharing code
- Sharing protocols
- Publishing Open Access
- Sharing Educational materials
- Science Communication

7. What is the greatest barrier to the uptake of Open Science practices?

- I do not perceive any barriers / not applicable
- Lack of experience
- Lack of time
- Lack of information/training
- Lack of someone to contact about this
- Lack of incentives
- Lack of interest from junior researchers
- Lack of funding
- Lack of supporting infrastructures
- Lack of mandates (funders, institute)
- Lack of guidelines and recommendations
- Lack of support from senior researchers or supervisors
- It is not the norm in my department/section
- I'm involved in industry collaborations
- Proprietary software
- I do not want to lose competitive advantage
- I work with sensitive/personal data
- Copyright/intellectual property concerns
- My data may be misused
- Other:

8. Why do you practice Open Science?

- I do not practice Open Science
- Requirements from funders
- Requirements from journals
- Requirements from TU Delft
- Because my research has a bigger impact when shared more openly
- Because I think this is important
- Other:

9. Do you need training, and if so, in which topics?

- Collaboration with industry (how to deal with restrictions imposed)
- Preparing a data management plan
- Preregistering a study/Writing a registered report
- Storing and long term preservation of data and results
- Choosing a license for data/software/papers
- Preparing the data/code for reuse
- Publishing the data/code underlying a publication
- Publishing preprints / open access
- Reusing shared materials of others
- Other:

10. Which of the following open science initiatives/courses at TU Delft are you aware of:

- Open Science Community Delft
- Data Champions
- 4TU.ResearchData
- Policies (Research Data, Software, Open Access)
- Courses (Research Data Management 101, Open Life Sciences)
- None of the above

11. Would you be interested in: (Not interested, Neutral, Interested)

- Annual Open Science event
- Open Science Award

12. Do you have any ideas on how to create an environment that encourages Open Science?

13. Is there an example of Open Science that you could share from your lab?

14. Have you helped others undertake Open Science practices in the past? If so, what practices and what did you learn?

15. Are you interested in the Open Science Team and/or would you like to participate? Leave your email here

16. Is there anything else you would like to share?

Resources

The Applied Sciences questionnaire was based on work already made available by other universities:

- University of Cardiff (2017, <https://osf.io/nts79>)
- University of Glasgow (within the research culture survey) (2019, <https://www.gla.ac.uk/myglasgow/ris/researchculture/researchculturesurvey>)
- Royal Holloway, University of London (2019, <https://osf.io/chqaj/>)
- Swinburne University of Technology (2019, <https://osf.io/a4bwp>, <https://osf.io/bk8y7>)
- University of Surrey (2020, <https://osf.io/623cz>)
- University of York (2020, <https://osf.io/ryzxe>)
- Utrecht University, Open Science monitor (2021, <https://www.uu.nl/en/news/first-open-science-monitor-survey-researchers-ready-for-open-science-now-time-for-action>)
- University of Twente, ICT strategic Plan on Open Science - Appendix B (2021, <https://doi.org/10.5281/zenodo.5113578>)

Articles:

- Gownaris et al. 2022 Barriers to Full Participation in the Open Science Life Cycle among Early Career Researchers
 - Article: <https://doi.org/10.5334/dsj-2022-002>
 - Survey: <https://doi.org/https://doi.org/10.5334/dsj-2022-002.s1>