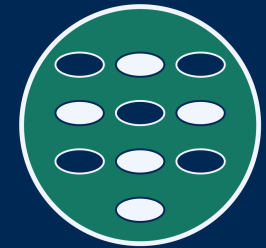




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# DAT390

## Data science seminar

### 3 Methodology

#### 3.2 Research data management (continued)

#### 3.3 Group collaboration proposals

#### 3.4 Reproducibility

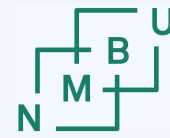


# Highlight talk schedule for today

Monday, 16<sup>th</sup> October 2023

Peer feedback from ...

- |  |    |                  |               |    |                      |
|--|----|------------------|---------------|----|----------------------|
| 15.15 – 15.19  | #1 | Awo Arab         | 15.19 – 15.21 | #1 | Sougata Bhattacharya |
| <b>Genomic prediction of complex traits in wheat using multispectral time-series data</b>        |    |                  |               |    |                      |
| 15.23 – 15.27  | #2 | Simen Holter     | 15.27 – 15.29 | #2 | Sujan Devkota        |
| <b>(undeclared topic)</b>  |    |                  |               |    |                      |
| 15.31 – 15.35  | #3 | Julie Overrein   | 15.35 – 15.37 | #3 | Artush Mktrchyan     |
| <b>Building yield prediction models with remote sensing and deep learning</b>                    |    |                  |               |    |                      |
| 15.39 – 15.43  | #4 | Asim Rasheed     | 15.43 – 15.45 | #4 | Halvor Steffenssen   |
| <b>EEM spectroscopy and PARAFAC modelling of water quality in nanofiltration</b>                 |    |                  |               |    |                      |
| 15.47 – 15.51  | #5 | Mahrin Tasfe     | 15.51 – 15.53 | #5 | Isak Vartdal-Gjerde  |
| <b>Deep learning identification and classification of paddy disease in precision agriculture</b> |    |                  |               |    |                      |
| 15.54 – 15.58  | #6 | Ulrik Egge Husby | 15.58 – 16.00 | #6 | Petter Bøe Hørtvedt  |
| <b>Exploring the landscape of explainable AI models: An empirical study</b>                      |    |                  |               |    |                      |



# Highlight talk schedule for week 43

Monday, 23<sup>th</sup> October 2023

Peer feedback from ...

15.15 – 15.19 #1 Eljar Alihosseinzadeh      15.19 – 15.21 #1 Ming Jeong Cheon

**One-shot learning in business analytics**

15.24 – 15.28 #2 Roy Granheim      15.28 – 15.30 #2 Rusith C. Hathurusinghe

**Impact of transfer learning on human activity recognition using kinect and Mediapipe**

15.33 – 15.37 #3 Sushant Kumar Srivastava      15.37 – 15.39 #3 Kristoffer Lien

**Automated interpretation of visual scenes for autonomous navigation**

15.42 – 15.46 #4 Joen Yacob Teklemariam      15.48 – 15.48 #4 Kim Son Ly

**Automated AI-based event detection systems with audio intensity**

15.51 – 15.55 #5 Baris Ustun      15.55 – 15.57 #5 Bastian Undheim Øian

**Data integration and presentation for drinking water works: Boost readability and reliability**



# Highlight talk schedule for week 45

**Monday, 6<sup>th</sup> November 2023**

**Peer feedback from ...**

15.15 – 15.19 #1 Amila Haputhanthri

15.19 – 15.21 #1 Ole Benjamin Gauslaa

**Wheat yield prediction using weather, soil, and phenotype data**

15.24 – 15.28 #2 Martin Myklebyst

15.28 – 15.30 #2 Ulrik Egge Husby

**Explainable AI readiness of data and models in journalism**

15.33 – 15.37 #3 Mats Hoem Olsen

15.37 – 15.39 #3 Tonje Martine L. Kirkholt

**Soil temperature model assessment and validation by use cases from agriculture**

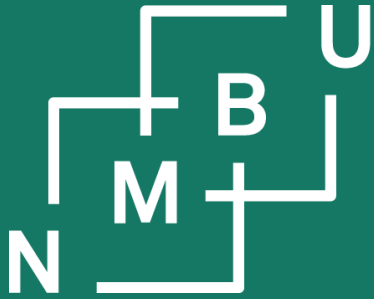
15.42 – 15.46 #4 Suhail Rauf  
(undeclared topic)

15.46 – 15.48 #4 Bikesh Shrestha

15.51 – 15.55 #5 Halvor Steffensen

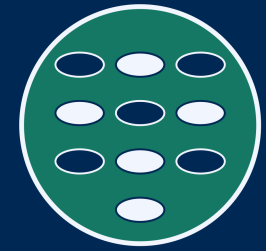
15.55 – 15.57 #5 Gurubaran Rajeshwaran

**Tsetlin-machine methods over gene data of deep-sea species**



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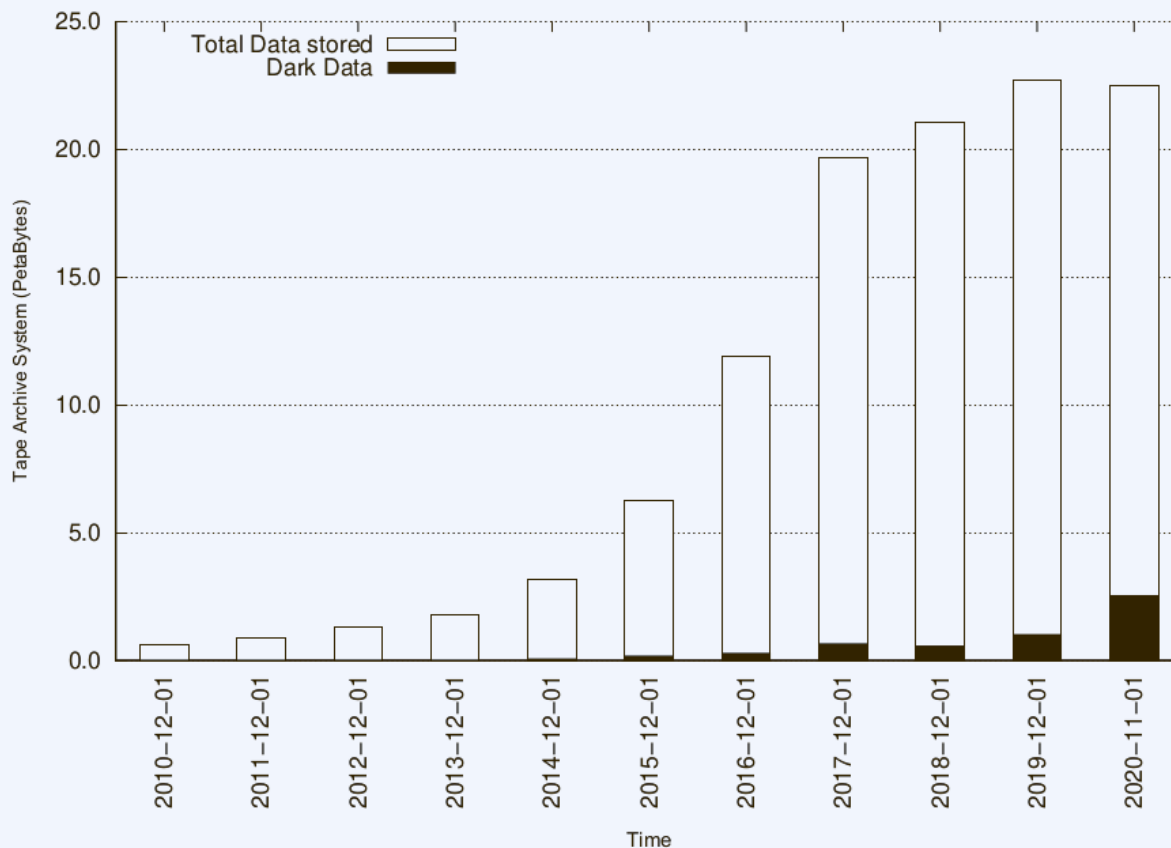
## 3 Methodology

### 3.2 Data management (ctd.)

# The challenge: Dark data

Dark data are data with an uncharacterized epistemic status.

In other words: *We do not know what we know from and about the data.*



dark data

**Flood of dark data:**  
*More and more data are accumulated, but are dark - and useless.*

Source: Björn Schembera and work by Juan Durán and Björn Schembera.<sup>1</sup>

# FAIR principles<sup>1</sup> in detail

persistent  
identifier

## Findability

- F1. Globally unique **persistent identifiers (PID)**
- F2. **Enriched with metadata**
- F3. **Data identifier** included in metadata
- F4. **Registered in searchable platform**

## Interoperability

- I1. **Formal language** used for **knowledge representation**
- I2. Metadata use **vocabularies** that are themselves FAIR
- I3. Semantic web principles, **data can refer to other data**

## Accessibility

- A1. **Retrievable from PID** via a standard protocol
  - A1.1. Open and freely implementable protocol
  - A1.2. ... **authentication/authorization** if necessary
- A2. Metadata remain accessible (beyond data)

## Reusability

- R1. Metadata include a plurality of accurate and relevant attributes
  - R1.1. Release data and metadata with an accessible **data usage license**
  - R1.2. Data are annotated with a detailed **provenance description**
  - R1.3. Relevant **disciplinary and community standards** are fulfilled

<sup>1</sup>M. D. Wilkinson et al., "The FAIR Guiding Principles ...," doi:10.1038/sdata.2016.18, **2016**.

# FAIR principles<sup>1</sup> in detail

persistent  
identifier

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  - A1.2. ... **authentication/authorization** if necessary
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- I1. **Formal language** used for **knowledge representation**
- I2. Metadata use **vocabularies** that are themselves FAIR
- I3. Semantic web principles, **data can refer to other data**

metadata

## Reusability

- R1. **Metadata include a plurality of accurate and relevant attributes**
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<sup>1</sup>M. D. Wilkinson et al., "The FAIR Guiding Principles ...," doi:10.1038/sdata.2016.18, 2016.



# Platforms for data storage and preservation

## Dataverse.NO

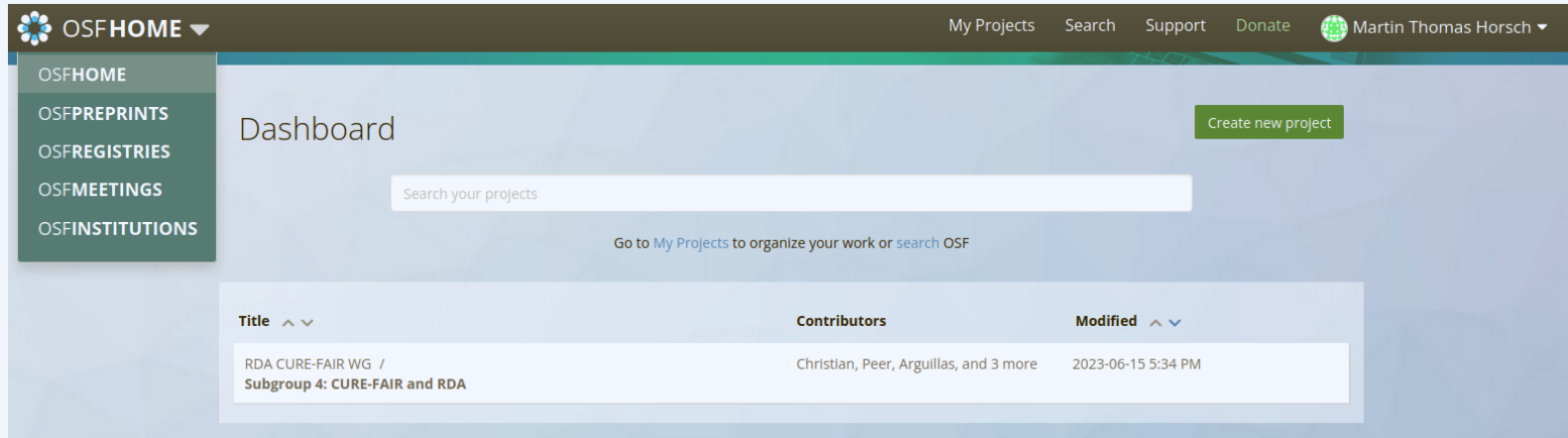
The screenshot shows the Dataverse.NO homepage. At the top, there is a navigation bar with a 'Metrics' tab showing '417,943 Downloads', the 'DataverseNO' logo, and 'Contact' and 'Share' links. Below this is a carousel of partner institutions: NORD University, Norwegian University of Life Sciences (NMBU), NTNU – Norwegian University of Science and Technology, and UiT The Arctic University of Norway. A search bar is present with the text 'Search this dataverse...' and an 'Advanced Search' link. The main content area displays '1 to 10 of 1,468 Results'. On the left, there are filters for 'Dataverses (25)', 'Datasets (1,443)', and 'Files (103,986)'. Below these are 'Dataverse Category' filters: 'Organization or Institution (14)', 'Research Project (5)', and 'Research Group (3)'. The main result shown is for a dataset titled 'Background data for: "Risky Positioning - social aspirations and risk-taking behaviour in avalanche terrain"' by Mannberg, Andrea, dated Oct 4, 2023. The description states: 'This dataset contains information from a survey that was distributed in North America from January to April, in 2018. To target the population of interest for this study, backcountry riders, we distributed a link to the survey via the American avalanche education provider the Ame...'

## Zenodo

The screenshot shows the Zenodo website interface. The top navigation bar includes the 'zenodo' logo, a search bar, and links for 'Upload', 'Communities', 'Log in', and 'Sign up'. The main heading is 'BioSpec Norway'. Below this, there is a 'Recent uploads' section with a search bar containing 'Search BioSpec Norway'. The first result is a dataset titled 'Data for New cold-adapted bacteria for efficient hydrolysis of feather waste at low temperature paper', dated 'March 25, 2023 (v1)'. The authors listed are Margarita Smirnova, Cristian Bolaño Losada, Volha Akulava, Boris Zimmermann, Achim Kohler, Uladzislau Miamin, Marije Oostindjer, and Volha Shapaval. The description reads: 'A novel cold-adapted bacteria *Arthrobacter oryzae* BIM B-1663 isolated from Antarctic green snow showed keratinase activity and efficient poultry feather degradation. A. oryzae strain degraded more than 80% of chicken feathers within 7 days of cultivation at 25°C. The optimal keratinase activity'. It was uploaded on March 25, 2023. To the right of the search results is a 'New upload' button and a 'Community' section featuring a red leaf with a white waveform graphic.

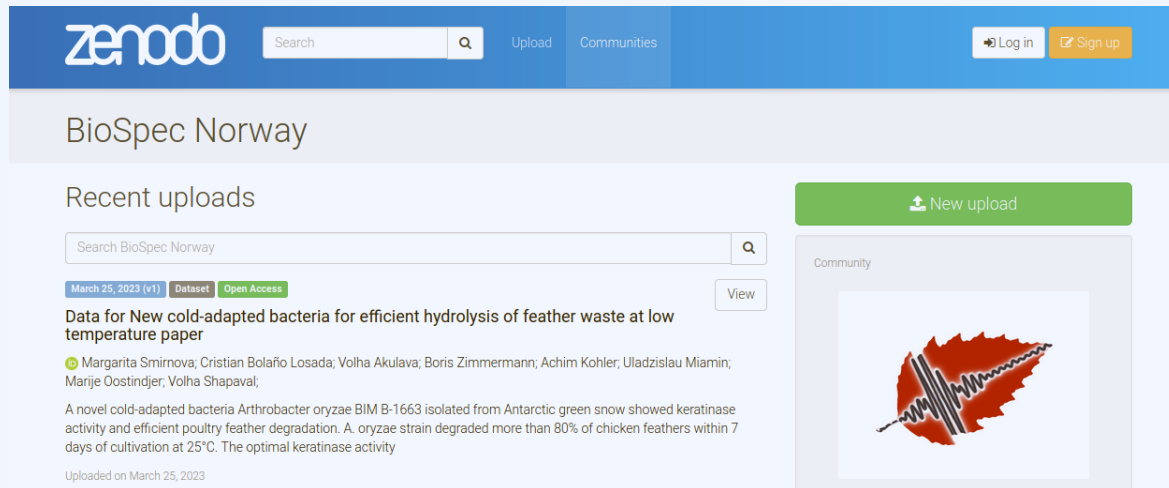
# Platforms for data storage and preservation

## Open Science Framework (OSF)

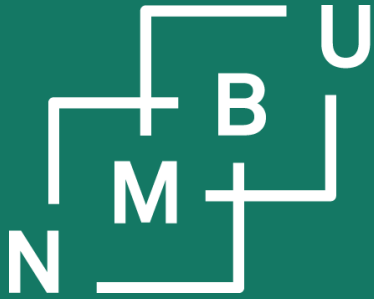


The screenshot shows the OSFHOME dashboard. At the top, there is a navigation bar with the OSFHOME logo, a dropdown menu, and links for My Projects, Search, Support, Donate, and a user profile for Martin Thomas Horsch. A left sidebar contains links for OSFHOME, OSFPREPRINTS, OSFREGISTRIES, OSFMEETINGS, and OSFINSTITUTIONS. The main content area is titled 'Dashboard' and features a 'Create new project' button, a search bar for projects, and a link to 'Go to My Projects to organize your work or search OSF'. Below this is a table of projects with columns for Title, Contributors, and Modified. One project is listed: 'RDA CURE-FAIR WG / Subgroup 4: CURE-FAIR and RDA' by 'Christian, Peer, Arguillas, and 3 more', modified on '2023-06-15 5:34 PM'.

## Zenodo

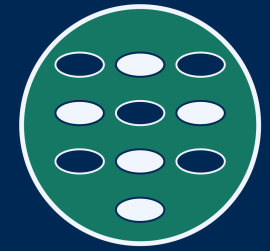


The screenshot shows the Zenodo website for the BioSpec Norway community. The header includes the Zenodo logo, a search bar, and links for Upload, Communities, Log in, and Sign up. The main content area is titled 'BioSpec Norway' and features a 'Recent uploads' section. A search bar is present, and a project is listed: 'Data for New cold-adapted bacteria for efficient hydrolysis of feather waste at low temperature paper', uploaded on March 25, 2023. The project is marked as a Dataset and Open Access. The authors listed are Margarita Smirnova, Cristian Bolaño Losada, Volha Akulava, Boris Zimmermann, Achim Kohler, Uladzislau Miamin, Marije Oostindjer, and Volha Shapaval. A brief description follows: 'A novel cold-adapted bacteria *Arthrobacter oryzae* BIM B-1663 isolated from Antarctic green snow showed keratinase activity and efficient poultry feather degradation. A. oryzae strain degraded more than 80% of chicken feathers within 7 days of cultivation at 25°C. The optimal keratinase activity'. The upload date is March 25, 2023. To the right, there is a 'New upload' button and a community image of a red leaf with a white waveform.



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## 3 Methodology

### 3.2 Data management (ctd.)

### 3.3 Group proposals

# Group collaboration plans and proposals

The group submission by 20<sup>th</sup> October is a mandatory activity.

It should have three elements (each up to two pages, 11pt font, A4 format):

- Synergy from a **planned group collaboration** beyond this semester.  
*(Only involving the group members, how can you support each other?)*
- **Proposed student-organized activity** for the coming semester.  
*(This would reach out to more than the group, but we will do only one.)*
- **Outcome and impact** of the proposed activity.  
*(How will you and the community benefit if the activity is selected?)*

You can cite references. The literature does not count toward the page limit.

**Indicate all who co-authored your document.** Keep in mind that for all those who do not contribute, the necessary consequence is that they fail DAT390.

The proposals will be evaluated by all the students together, in a competitive process. However, the result will have no impact on your character grade.

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You can cite references. The literature does not count toward the page limit.

Indicate all who co-authored your document. Keep in mind that for all those who do not contribute, the necessary consequence is that they fail DAT390.

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# Group proposal competition: Week 43

The eight groups will each describe an idea for joint activities next semester (as a **proposal**, to be realized if selected) and their potential for synergy and collaboration among themselves (as a **plan**, to be realized irrespective).

1. **Visionary Mind**
2. **The Second Land Pirate**
3. **The Overfitters**
4. **Thesis Titans IV**
5. **Group 5**
6. **BANKTOG**
7. **Thesis Titans VII**
8. **The Forecasters**

In the **first elimination round**, they will be evaluated by individual blind peer review in 1:1 competitions. Before review, the proposals will be presented at seminar time.

## **Monday, 23<sup>rd</sup> October 2023 (week 43)**

14.20 – 14.40      The Overfitters  
                              ./ The Forecasters

14.40 – 15.00      The Second Land Pirate  
                              ./ Group 5

# Group proposal competition: Week 45

The eight groups will each describe an idea for joint activities next semester (as a **proposal**, to be realized if selected) and their potential for synergy and collaboration among themselves (as a **plan**, to be realized irrespective).

1. **Visionary Mind**
2. **The Second Land Pirate**
3. **The Overfitters**
4. **Thesis Titans IV**
5. *Group 5*
6. **BANKTOG**
7. **Thesis Titans VII**
8. **The Forecasters**

In the **first elimination round**, they will be evaluated by individual blind peer review in 1:1 competitions. Before review, the proposals will be presented at seminar time.

## **Monday, 6<sup>th</sup> November 2023 (week 45)**

14.20 – 14.40      Thesis Titans IV  
                                  ././ Thesis Titans VII

14.40 – 15.00      Visionary Mind  
                                  ././ BANKTOG

# How to present the proposals?

The submitted documents will be shared among the students on Canvas.

The proposals will also be presented in 1-on-1 competitions at seminar time:

- Six minutes for the **first proposal**, presented by three group members
  - Synergy
  - Activity
  - Outcome
- Six minutes for the **second proposal**, presented by three group members
  - Synergy
  - Activity
  - Outcome
- Six minutes **discussion**

(Plus two minutes reserve for technical issues)



# Group proposal evaluation: Synergy

In the first round, plans/proposals are evaluated on a scale from **0 to 15 points**, with 0 to 5 from each of the three aspects **synergy**, activity, and outcome. If you are selected to evaluate two plans on **synergy**, ask yourself questions such as:

**"A" 5 points**

**"B" 4 points**

**"C" 3 points**

(should be the norm)

**"D" 2 points**

**"E" 1 point**

**"F" 0 point**

(only if not addressed)

Does the group identify one or multiple **common research question(s)** of interest to them? Is this concrete and specific enough? Is it **realistic** that some new insight can be gained on this by the group's joint effort?

Does the group identify one or multiple **mutual support mechanism(s)** that will help them become stronger together? Is it **realistic**, without requiring too much effort?

# Group proposal evaluation: Activity

In the first round, plans/proposals are evaluated on a scale from **0 to 15 points**, with 0 to 5 from each of the three aspects synergy, **activity**, and outcome. If you are selected to evaluate proposals on **activity**, ask yourself questions such as:

**"A" 5 points**

**"B" 4 points**

**"C" 3 points**

(should be the norm)

**"D" 2 points**

**"E" 1 point**

**"F" 0 point**

(only if not addressed)

Does the group concretely describe one or multiple **student-driven activities**? In the proposal, is it **clearly described** what exactly is to be done? Can it **realistically** be done?

Would the proposal, if realized, succeed at **involving students beyond the group** itself? To how much of the *community of final year master students in data science* would it be of interest? Is the involvement of other students **clearly described**, and is it **realistic**?

# Group proposal evaluation: Outcome

In the first round, plans/proposals are evaluated on a scale from **0 to 15 points**, with 0 to 5 from each of the three aspects synergy, activity, and **outcome**. If you are selected to evaluate proposals on **outcome**, ask yourself questions such as:

**"A" 5 points**

**"B" 4 points**

**"C" 3 points**

(should be the norm)

**"D" 2 points**

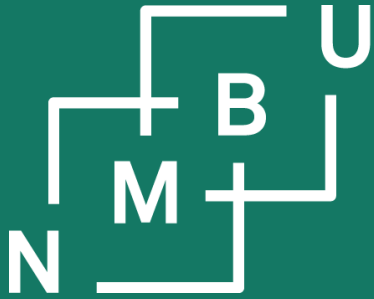
**"E" 1 point**

**"F" 0 point**

(only if not addressed)

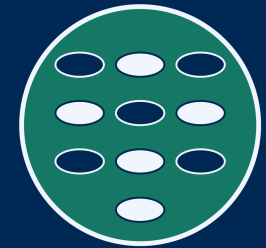
Does the proposal concretely describe the potential **benefit to the community** from realizing the proposed activities? Does it take into account the **community's needs**?

Are the outcomes described in a **measurable and verifiable** way, e.g., using key performance indicators and **SMART objectives**? Is it convincingly explained how the proposed activities would **realistically** lead to reaching the promised outcomes?



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## 3 Methodology

3.2 Data management (ctd.)

3.3 Group proposals

3.4 Reproducibility

# Data for replication of scientific findings

## Dataverse.NO

Metrics 417,943 Downloads Contact Share

Search this dataverse... Advanced Search

Datasets (25)  Datasets (1,443)  Files (103,986)

**Dataverse Category**  
Organization or Institution (14)  
Research Project (5)  
Research Group (3)

1 to 10 of 1,468 Results Sort

Background data for: "Risky Positioning - social aspirations and risk-taking behaviour in avalanche terrain"  
Oct 4, 2023 - UiT The Arctic University of Norway  
 Mannberg, Andrea, 2023, "Background data for: "Risky Positioning - social aspirations and risk-taking behaviour in avalanche terrain"", <https://doi.org/10.18710/UHPYAB>, DataverseNO, V1

This dataset contains information from a survey that was distributed in North America from January to April, in 2018. To target the population of interest for this study, backcountry riders, we distributed a link to the survey via the American avalanche education provider the Ame...

Files Metadata Terms Versions

## DataverseNO

Citation Metadata

**Persistent Identifier** doi:10.18710/BXFHQ1

**Publication Date** 2023-09-04

**Title** Replication Data for: Red and melanized focal changes in white skeletal muscle in Atlantic salmon (*Salmo* analysis of farmed, wild, and hybrid fish reared under identical conditions.

**Author** Brimsholm, Malin (Norwegian University of Life Sciences (NMBU)) - ORCID: [0009-0002-2724-3822](https://orcid.org/0009-0002-2724-3822)

**Point of Contact** Use email button above to contact.  
Brimsholm, Malin (Norwegian University of Life Sciences (NMBU))

**Description** Focal melanization in the skeletal muscle of farmed Atlantic salmon is a great welfare and economic problem in the aquaculture industry. The focal discoloration is a result of a chronic inflammation in the skeletal muscle. This condition has not been observed in

Export Metadata

- Dublin Core
- DDI
- DataCite
- DDI HTML Codebook
- JSON
- OAI\_ORE
- OpenAIRE
- Schema.org JSON-LD

# Reproducibility, verification, and falsification

reproducibility

There are many definitions of reproducibility and replicability; see the review by Hans Ekkehard Plesser.<sup>1</sup>

- 1) Researcher  $a$  did  $\kappa$  and found  $\varphi$ .
- 2) Researcher  $b$  did  $\gamma$ , which is **very similar to  $\kappa$** , and found  $\zeta$ , **not very similar to  $\varphi$** .
- 3) Nobody disputes  $a$ 's integrity. Nobody disputes that  $a$  did  $\kappa$  and found  $\varphi$ .

## Reproducibility claim

«Whenever the research process  $\kappa$  is carried out, it **must** lead to the outcome  $\varphi$ .»

<sup>1</sup>H. E. Plesser, *Frontiers Neuroinform.* **11**: 76, doi:10.3389/fninf.2017.00076, **2018**.

# Reproducibility, verification, and falsification

Common formulation and schema for reproducibility claims (RCs):

«Whenever research process  $\kappa''$  is carried out, it must lead to the outcome  $\varphi''$ .»

1) Researcher  $a$  did  $\kappa$  and found  $\varphi$ .

Here,  $a$  also made a **positive reproducibility claim  $\psi$** .

2) Researcher  $b$  did  $\gamma$ , **consistent with  $\kappa''$** , and found  $\zeta$ , **inconsistent with  $\varphi''$** .

Here,  $b$  made the **negative reproducibility claim  $\neg\psi$** .

3) What is relevant there is the **contradiction between  $\psi$  and  $\neg\psi$** .

provenance metadata  $\kappa$

provenance paradata  $\kappa'$

---

**provenance orthodata  $\kappa'' = \kappa - \kappa'$**

«repeat  $\kappa$ , but no need to retain  $\kappa'$ »

knowledge claim metadata  $\varphi$

knowledge claim paradata  $\varphi'$

---

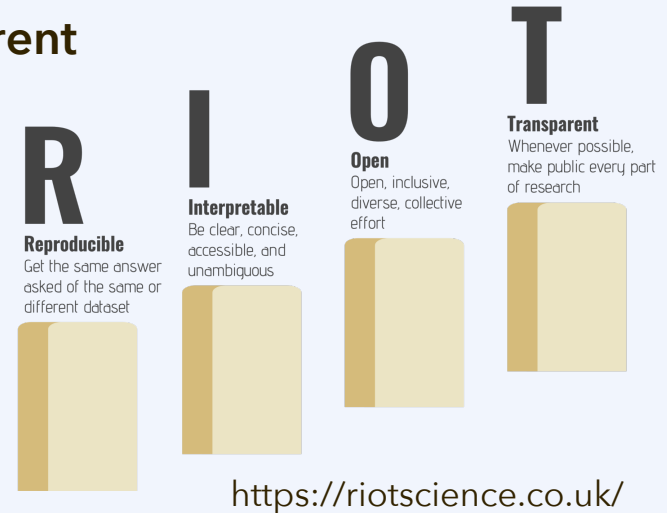
**knowledge claim orthodata  $\varphi'' = \varphi - \varphi'$**

«obtain  $\varphi$  again, except for  $\varphi'$  maybe»

# Good practices beyond FAIR

## RIOT:<sup>1</sup> Reproducible, Interpretable, Open, Transparent

- Origin: UK Reproducibility Network (UKRN)
- UKRN encouraged foundation of the other reproducibility networks, such as NORRN, the Norwegian Reproducibility Network
- Local “RIOT science clubs” were founded



## CARE:<sup>2</sup> Collective benefit, Authority to control, Responsibility, Ethics

- Origin: Global Indigenous Data Alliance
- Uptake supported by the Research Data Alliance
- Orientation: Sovereignty and epistemic justice

<https://www.gida-global.org/care/>



<sup>1</sup>E. Ganley *et al.*, *BMC Res. Notes* **15**: 51, doi:10.1186/s13104-022-05932-5, **2022**.

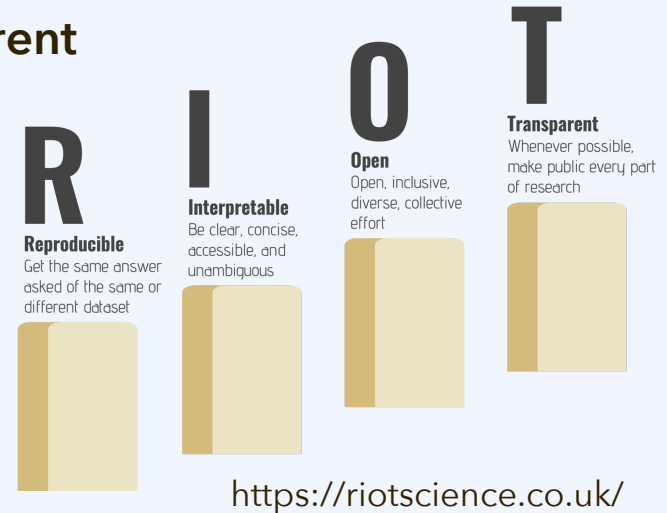
<sup>2</sup>S. Russo Carroll *et al.*, *Sci. Data* **8**: 108, doi:10.1038/s41597-021-00892-0, **2021**.



# Good practices beyond FAIR

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<sup>1</sup>E. Ganley *et al.*, *BMC Res. Notes* **15**: 51, doi:10.1186/s13104-022-05932-5, **2022**.

<sup>2</sup>S. Russo Carroll *et al.*, *Sci. Data* **8**: 108, doi:10.1038/s41597-021-00892-0, **2021**.

# Norwegian Reproducibility Network

## Our Mission

The Norwegian Reproducibility Network (NORRN) is a peer-led network that aims **to promote and enable rigorous, robust and transparent research practices in Norway**. We attempt to achieve this goal by establishing appropriate training activities, designing, and evaluating research improvement efforts, disseminating best practices, and working with stakeholders to ensure coordination of efforts across the sector. NORRN's activities span multiple levels, including researchers, librarians, institutions, and other stakeholders (e.g., funders and public authorities).



### Researchers

We **support researchers** in educating themselves about open science practices, and founding local open science communities.



### Initiatives

We **connect Reproducibility Initiatives** to a national network, and foster connections between them.



### Institutions

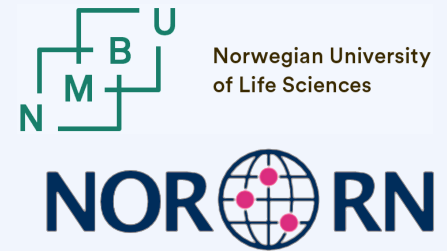
We **advise institutions** on how to embed open science practices in their work.



### Stakeholders

We **represent the open science community** toward other stakeholders in the wider scientific landscape.

# Norwegian Reproducibility Network



## Our Mission

The Norwegian Reproducibility Network (NORRN) is a peer-led network that aims **to promote and enable rigorous, robust and transparent research practices in Norway**. We attempt to achieve this goal by establishing appropriate training activities, designing and evaluating research improvement efforts, disseminating best practices, and working with stakeholders to ensure coordination of efforts across the sector. NORRN's activities span multiple levels, including researchers, librarians, institutions, and other stakeholders (e.g., funders and public authorities).

**Norwegian Reproducibility Network: <https://www.norrn.no/>**

**Schedule a meeting for all those interested in creating a NORRN node for Ås:**

**<https://terminplaner6.dfn.de/p/491179ac2aaea450dd6f015191d08269-429068>**

Researchers

Initiatives

Institutions

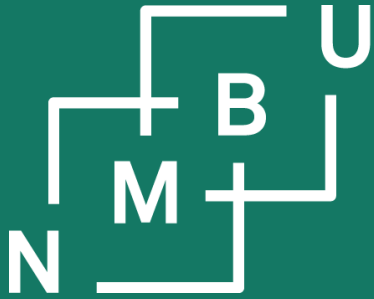
Stakeholders

We **support researchers** in educating themselves about open science practices, and founding local open science communities.

We **connect Reproducibility Initiatives** to a national network, and foster connections between them.

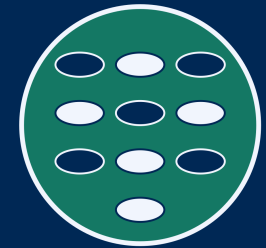
We **advise institutions** on how to embed open science practices in their work.

We **represent the open science community** toward other stakeholders in the wider scientific landscape.



Noregs miljø- og  
biovitenskaplege  
universitet

# Mid-term evaluation (underveisevaluering)



# Mid-term evaluation

Nettskjema

The form should be anonymous. [Show more](#)

## DAT390 2023H mid-term evaluation

What feature of the DAT390 course appears to work best?

What feature of the DAT390 course makes least sense?

"It makes sense to organize a seminar with about 50 students."  
From "0: totally disagree" to "5: totally agree."

Which of these alternatives would you most recommend?

- DAT390 should be abolished.
- DAT390 should be reworked and reduced to 5 ECTS study points.
- DAT390 should be reworked and remain at 10 ECTS study points.
- DAT390 should remain as is.

"DAT390 should be mandatory for all master students in data science."  
From "0: totally disagree" to "5: totally agree."

Value

The following concrete change would help improve DAT390:

<https://nettskjema.no/a/dat390>

"I have learnt something important in DAT390 so far."  
From "0: totally disagree" to "5: totally agree."

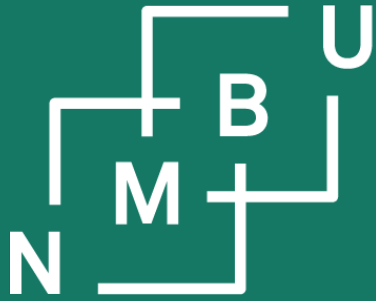
Value

"I believe that the remainder of DAT390 will help me learn something important."  
From "0: totally disagree" to "5: totally agree."

Which of these alternatives would you most recommend?

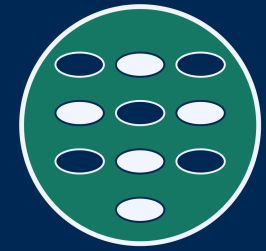
- DAT390 should be offered in English only.
- DAT390 should be offered both in English and in Norwegian.
- DAT390 should be offered in Norwegian only.

"The written feedback provided by the lecturer is useful."  
From "0: totally disagree" to "5: totally agree." Please only respond if you have received written feedback.



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Institutt for datavitenskap



Digitalisering på Ås

# DAT390

## Data science seminar

### 3 Methodology

#### 3.2 Research data management (continued)

#### 3.3 Group collaboration proposals

#### 3.4 Reproducibility