

Guidelines of Good Research Practice

Leibniz Institute on Aging – Fritz
Lipmann Institute



*We dedicate this handbook to PD Dr. Matthias Görlach (1955-2023),
long-time ombudsperson and colleague at FLI.*

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DOI: [10.5281/ZENODO.8276433](https://doi.org/10.5281/ZENODO.8276433)
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VERSION 03: April 25th, 2024 (*Replaces version 02, see Version History*)

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ABBREVIATIONS

ABS *Assessment Before Submission*

CF *Core Facility at the FLI*

CRIS *Current Research Information System (database of metadata of research activities)*

CS *Core Service at the FLI*

DFG *Deutsche Forschungsgemeinschaft*

DMP *Data Management Plan*

ELN *Electronic Laboratory Notebook*

FACS *Fluorescence Activated Cell Sorting*

FAIR *Findable, Accessible, Interoperable, Reusable*

GRP *Good Research Practice*

HCS *High Content Screening*

IP *Intellectual Property*

MS *Mass Spectrometry*

RDM *Research Data Management*

RT-PCR *Real-Time Polymerase Chain Reaction*

SOP *Standard Operating Procedure*

VERSION HISTORY

Version	Date	Comment
01	2023-02-28	First complete version, translated from German
02	2023-07-06	Replaces version 01; changes in Appendix 8 (WB)
03	2024-04-25	Replaces version 02; added design, emphases, marginalia, new section 4.2; minor corrections in the main document; major revision of appendices A, H-K, appendix G is now A.5; minor corrections in appendix L (now K), removal of appendix M (JW et al.)

FOREWORD

This document, the “**FLI Guidelines of Good Research Practice**” (GRP) is **based** primarily on the “**Code of Conduct** of the German Research Foundation” (DFG) published in 2019¹ and the “**Leibniz Code for Good Research Practice**” adopted in 2021^{2,3}

Basis of this document

The **DFG Code of Conduct** is a reference work on scientific integrity that is aimed at both scientists and universities and non-university research institutions to which the FLI belongs. It **summarizes the central standards** of good research practice and describes procedures in the event that these standards are not observed. The **legally binding implementation** of the guidelines (first level of the Code) and of the explanations (second level) by institutions is a prerequisite for receiving funding from the DFG.

The DFG Code of Conduct is substantiated and interpreted by practical and subject-specific commentaries in the associated online portal.⁴ Its predecessor, the memorandum “Safeguarding Good Scientific Practice,” published in 2013, continues to serve as a supplementary reference guide.⁵

The Guidelines of GRP **at the FLI** implement the DFG Code of Conduct and its supplements and adapt them to the specific needs of the FLI. It is intended as a **local supplement** to the “Leibniz Code for Good Research Practice,” which is recognized and implemented by the FLI.

Particularly regarding the tasks of the ombudspersons and the rules of procedure for suspected scientific misconduct, these Guidelines are supplemented by the “Guidelines for Good Scientific Practice in the Leibniz Association”⁶.

¹ Deutsche Forschungsgemeinschaft. (2019). Guidelines for Safeguarding Good Research Practice. Code of Conduct. <https://zenodo.org/doi/10.5281/zenodo.3923601>

² Leibniz Gemeinschaft. (2021). Leibniz Code for Good Research Practice. (PDF). Last accessed: 2024-03-19. https://www.leibniz-gemeinschaft.de/fileadmin/user_upload/Bilder_und_Downloads/%C3%9Cber_uns/Gute_wissenschaftliche_Praxis/Leibniz_Code_for_Good_Research_Practice.pdf

³ The term “Good scientific practice” used in the 2013 DFG Memorandum was replaced by “Good research practice” in the DFG Code of Conduct, but both terms can be used interchangeably.

⁴ Deutsche Forschungsgemeinschaft. (2024). Research Integrity, Portal for Code of Conduct “Guidelines for Safeguarding Good Research Practice”. (Website). Last accessed: 2024-03-19. <https://wissenschaftliche-integritaet.de/en/>

⁵ Rixen S. (2019). Gute wissenschaftliche Praxis.. Der neue Kodex der DFG. Forschung & Lehre 9/2019, pp. 818ff. (PDF). Last accessed: 2024-03-19. https://forschung-und-lehre.epaper-archiv.de/fileadmin/user_upload/forschungUndLehre/2019/09/818/.

⁶ Leibniz Gemeinschaft. (2019). Guidelines for Good Scientific Practice in the Leibniz Association (PDF). Last accessed: 2024-03-19. https://www.leibniz-gemeinschaft.de/fileadmin/user_upload/Bilder_und_Downloads/Über_uns/Integrität/Guidelines_for_Good_Scientific_Practice_in_the_Leibniz_Association.pdf

1. SCOPE

The research bodies institutionalized in the Federal Republic of Germany enjoy the privilege of freedom of research and concomitant academic self-government. This privilege includes the duty of the institutions to adopt rules of good research practice. In the form of **these Guidelines, the FLI informs its staff of the locally established rules of good research practice, which they are obliged to observe.**

FLI staff include, in particular, all scientifically active persons, regardless of their position, qualifications, or activities. This also includes persons with a guest contract, for example students. This document also applies if someone is no longer working at or for the FLI and is affected by an allegation of possible research misconduct made in connection with their former activity at or for the FLI.

NOTE: Beyond the rules set out in the Guidelines, all other relevant local, national, and international codes of good research practice, research integrity, and research ethics apply to FLI staff. In the event of contradictions or inconsistencies, the more specific or stricter regulations apply as a rule. A list of important documents can be found in the ⇒ [Appendix](#).

What to do?

The staff of the FLI are obliged to **read** the relevant contents of these Guidelines in a timely manner, **at the latest when starting work**, and to put them into practice. In the event of questions, ambiguities, or issues regarding the interpretation of the Guidelines, the following can be **contacted**: the ombudspersons, the research coordinator, the data steward, the coordinator career development, and the coordinator for third-party funding.

The staff of the FLI are **obliged to act according to good research practice**, e.g., in the planning and execution of research projects, in the publication process, as reviewers, editors, as lecturers or interviewees, as supervisors and teachers, and as members of scientific commissions.

The staff of the FLI are obliged to **update** their knowledge of the rules of good research practice regularly and independently. This includes attending the training events offered at the FLI or at universities.

If necessary, the members of a working unit of the FLI should adopt additional rules of good research practice (e.g., for the handling of data or for the documentation of the research process) and update them as required.

2. PRINCIPLES OF GOOD RESEARCH PRACTICE

Research is driven by the will to search for truth and requires the absolute integrity of all those involved in the research process. This **integrity** is also the basis of society's trust in scientists. Dishonesty is not only contrary to the purpose of research, but damages people's **trust in researchers, in the research process, and in research results**.

Researchers must strive for **objectivity** and for intersubjective comprehensibility in their work, train their **critical faculty**, and cultivate their willingness to **accept criticism**. One's own results, as well as the work of other researchers, must always be critically evaluated.

FAIR & Open

The repetition of research and the reproducibility of research results require the recording of the research process *lege artis*, that is, according to the rules of the profession. Understandability, **reproducibility, comparability, and transferability require transparency**, i.e., the complete preservation and accessibility of the research data and its documentation and metadata required for this purpose. Research data that can be accessed via online services must be prepared in accordance with the **FAIR principles**⁷, summarized in ⇒ **Appendix C**. All actions towards this end can be collectively described as **research data management (RDM)**. Information on the basics and application of RDM can be found in the link list in ⇒ **Appendix A.3**.

Research results obtained at the FLI are made publicly available as a matter of principle. **Even unexpected, contradictory, or inconclusive results are published**, provided they are plausible and reproducible and not the result of technical or other errors, and if they may be of interest to the scientific community.

The research process is a social practice. It succeeds only if those involved **cooperate** and support each other, if they treat each other with respect, strive for successful communication, recognize, and appreciate achievements in an **equitable** manner, and use the available resources sparingly. All those working in research at the FLI are obliged to implement these principles in their social practice.

Responsible PIs

Heads of scientific working units, supervisors, and superiors have a special **responsibility for communicating and monitoring** good research practice at the FLI. They always **act in an exemplary manner** and ensure that the rules of good

⁷ FAIR Principles: F – findable, A – accessible, I – interoperable, R – reusable. Introduced by Mark Wilkinson *et al.* (2016) The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* **3**, 160018. <https://doi.org/10.1038/sdata.2016.18>

research practice are known to all their staff. They promote a culture in which learning from mistakes is possible and refrain from any kind of abuse of power. In this context, care is always taken to ensure that the basic rules of the FLI Code of Conduct are observed among colleagues.

FLI staff must **know their tasks, rights, and duties**. It is the responsibility of their respective supervisors and superiors to ensure this.

Junior researchers are entitled to appropriate **supervision** (see ⇒ [Chapter 7](#)).

More key principles

Third-party intellectual property must always be respected. Material taken from the relevant works of others must be **credited**.

Legal and ethical standards must always be observed.

Quality always takes precedence over quantity when applying performance and evaluation criteria.

FLI staff check whether they have **competing interests** in their work (e.g., as reviewers) and, if so, make such a conflict transparent.

FLI staff consider the context of their research when collecting and evaluating data, and when interpreting results, and make the **context transparent** in all publications.

FLI staff clearly **state their own scientific expertise** in all scientific communications (e.g., conferences, interviews, Twitter).

3. RESEARCH DESIGN, PLANNING, AND PREPARATION

Research is concerned either with further substantiating and validating existing bodies of knowledge through repetition or with generating new bodies of knowledge by identifying and **filling a knowledge gap**, whether hypothesis-driven or exploratory.

From
hypothesis
to plan

All research is based on prior research. Therefore, when planning a research project, the state of the **relevant literature and existing research data** is carefully researched, acknowledged, and recorded. FLI staff document the path from existing literature to a research idea and on to the research question or hypothesis and research design/plan in such a way that the genesis of the hypothesis or guiding research question and all sources are traceable.

NOTE: Preliminary studies for the establishment of a future research project are justifiable within reasonable limits and may be necessary. These are presented as such in publications, proposals, and other texts.

When planning an empirical or experimental research project, care should be taken to **plan the statistics** carefully: sample size, effect size, variance, appropriate statistical methodology, etc. To ensure this, the statistical planning should be discussed with suitable experts (e.g., staff of CF Life Science Computing) before submitting the application or before starting the practical work.

Already during the planning of a research project, but also at any time during its implementation, FLI staff **assess possible consequences of their research** and take them into account in the research output (see chapter 5). They handle their research freedom in a responsible manner.

Subjective influences on the conduct and on the results of research should be avoided as much as possible. Methods to **avoid bias**, e.g., blinding, should be planned and applied. Relevant contextual variables should be identified, documented, and reported.

Prior to conducting a research project, FLI staff shall obtain and document all necessary **permissions and licenses** (ethics votes, software licenses, access authorizations, approvals, briefings, etc.) in a timely manner. Research Group Leaders and Core Facility Managers (in the following collectively referred to as entity heads) are responsible for ensuring they are obtained in time. They must be presented upon request.

The **principles** of good research practice also **apply when writing applications** for approval or for funding of a research project.

If possible, **research plans** including hypotheses, methodology, sample size, and statistics **are pre-registered** in recognized portals. A selection of portals can be found in ⇒ [Appendix A.2](#).

To answer research questions, FLI staff correctly apply scientifically sound and plausible methods. **Staff must be trained and instructed before applying methods** or operating equipment. Responsibility for ensuring timely training or instruction rests with the respective entity heads. The possession of the necessary competencies is to be **verified and documented**, if necessary (see ⇒ [Chapter 4.1](#) and ⇒ [Chapter 4.6](#)). Competencies for which there is no structured instruction can also be acquired and documented through their application in practical circumstances.

Subject-specific **standards** must be observed. When establishing new standards, care must be taken to document all steps as carefully as possible; see ⇒ [Appendix B](#).

Arrangements for cooperation and the individual and institutional responsibilities shall be **communicated** at the beginning of the cooperation and throughout its duration in accordance with the Montreal Statement⁸, the Guideline Risk Management (see ⇒ [Appendix A.1](#)) and **authorship** considerations for members of Core Facilities and Core Services (see ⇒ [Appendix G: Authorship](#)).

The management of research data should be governed by a **specific data management plan (DMP)**. This plan should be formulated at the latest at the beginning of a research project or should be developed from the plan created in connection with the funding application. The creation of a DMP should be supported by the person responsible for data management support, e.g., through individual advice and training or text modules on the FLI intranet.⁹

The **DMP** will be made **available** to all parties involved in the research project in a timely manner, **reviewed** regularly, and **updated** as needed.

NOTE: The **elements** to be included in the DMP are explained on the web pages listed in ⇒ [Appendix A.4](#). This section also includes a list of DMP tools.

⁸ World Conferences on Research Integrity. (2013). Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations. (Website). Last accessed: 2024-03-19. <https://wcrif.org/guidance/montreal-statement>

⁹ FLI-Website: Data Steward. Last accessed: 2024-03-19. <https://www.leibniz-fli.de/research/good-scientific-practice/data-steward-at-fli>

4. CONDUCTING RESEARCH

4.1. COMMUNICATION AMONG PARTICIPANTS ABOUT THE RESEARCH PROJECT

At the beginning and as needed, those involved in a research project discuss their **roles, rights, duties, and responsibilities** regarding the research project. Resulting agreements are **recorded in writing** and are always accessible to everyone. The agreements are **reviewed** regularly and adjusted, if necessary, especially when new staff join the team.

Pls ensure GRP

At the **start of a research project** or after new staff members have joined, the **entity heads ensure** that good research practice is observed. This means particularly that they make sure whether and to what extent:

- staff members are clear about their **roles**, duties, and responsibilities in the research process and beyond;
- staff members are familiar with the **use** of equipment, machines, computers, processes, etc.;
- staff members are familiar with the **protocols** and statistical procedures to be used;
- staff members are familiar with the **criteria** for scientific **documentation**;
- the basics, procedures, and tools of **research data management (RDM)** are known (see FLI website¹⁰).

If the required knowledge or skills are insufficient, the entity **heads** shall **instruct** the **staff members** accordingly; the instruction may be delegated to qualified persons. The entity heads must ensure that their employees have understood the instruction provided. The instruction provided shall be **documented** in writing and confirmed by signature.

Every research group has **regular lab meetings** to secure the progress of projects and the quality of experiments. The entity head ensures that data presented in **group-internal progress reports** are critically evaluated for proper controls, number of replicates, and adequate use of statistical tests. In group-internal progress reports scientists should be encouraged to present also unprocessed data (e.g., uncropped, full-size blots or gels, full-sized fields of view of microscopic images). For FLI work-in-

¹⁰ FLI-Website: Research Data Management at the FLI. Last accessed: 2024-03-19. <https://www.leibniz-fli.de/research/good-scientific-practice/rdm-at-fli>

progress seminars, supervisors should ensure that data are presented according to the criteria above and that unprocessed data are available upon request.

4.2. CREATING A PROPER RESEARCH ENVIRONMENT

The entity head ensures the correct functioning, updating and calibration of all **laboratory equipment and instruments**.

The entity head ensures that identity and authenticity of all **research materials** are properly validated and documented, e.g., that cell lines are regularly tested for microbiological contamination like mycoplasma; that passage numbers, storage, media, and serum lot are recorded properly.¹¹

The entity head ensures that sufficient biological/technical **replicates** are performed, that correct analysis tools/statistics are used, and that all experimental/analysis steps are sufficiently documented to ensure reproducibility.

The entity head ensures that **protocols** and **SOPs** (Standard Operating Procedures) are created and correctly applied to secure quality control for the specific type of data generated in their facilities, e.g., image acquisition with proper acquisition time (linear range), with identical settings for quantifications; standardized quality and contamination checking of input materials and of output Omics data.

The entity head makes sure that data and metadata can be **stored** appropriately and in a structured manner, i.e., storage media with enough space and **group standards** for data filing are available.

4.3. DOCUMENTATION OF THE RESEARCH PROCESS

The **entire research process** must be appropriately **documented**, regardless of whether it leads to a research output (master's/bachelor's thesis, dissertation, postdoctoral thesis, journal publication, book contribution, poster, contributions to conference proceedings or on social media, etc.).

The research process must be documented in such a way that a professionally qualified person is **able to trace** the **research process** seamlessly and, if necessary, **replicate** and **evaluate** the results and conclusions.

NOTE: Findings that **do not support** hypotheses, assumptions, or conclusions are also **recorded** and made publicly **available** as appropriate.

¹¹ It is strongly recommended to identify research materials and resources with a unique identifier, as provided by the database Research Resource Identification (RRIDs): <https://www.rrids.org/>

A list of **criteria of appropriate documentation, recording, storage, and archiving** can be found in ⇒ **Appendix B**. If there is any deviation from the established documentation criteria, this must be plausibly justified and documented.

During the research process, the **responsibility** for proper **documentation** of the research process, for appropriate **recording** of analog and digital research data, and for the correct **storage** of samples and other substances lies with those FLI employees who have the **closest contact** with the data, documents, and substances, i.e., who collect, produce, gather, evaluate, interpret, or otherwise process them.

4.4. RESEARCH DATA

Research data are both the basis and the result of scientific work. They can be divided into original data, processed data, metadata, and research-related records.

Types of data

Original or raw data are those research data that are collected, generated, or used directly at the source; these include, but are not limited to, experimental data documented electronically or in analog form, samples or objects, software and hardware, scripts and codes, information on equipment used, working materials and consumables, protocols, methods, observations, error records, parameters, settings, environmental and contextual variables. A method-oriented list can be found in ⇒ **Appendix H: Definitions**.

Processed or derived data are produced by statistical or other forms of processing of data; the processing path (e.g., by statistical procedures, calculations, script applications, or command line calls) must also be appropriately documented.

Metadata are data necessary to understand original or processed data or the processing path; they must be appropriately documented.¹² Standardized schemes for metadata are provided in FLI internal archiving.¹³ More information is provided in ⇒ **Appendix I: Documentation**.

The **research-related records** comprise those documents that enable the research process to be traced in its entirety; this includes, among other things, grant applications, expert assessments and votes, permissions, access authorizations and licenses, the relevant correspondence of all participants (especially emails and letters), meeting notes, agreements, contracts, manuscript versions, literature lists, hypotheses, and presentations.

¹² Website of Harvard's Longwood Medical Area Research Data Management Working Group (LMA RDMWG). Last accessed: 2024-03-19. <https://datamanagement.hms.harvard.edu/collect-analyze/documentation-metadata>

¹³ FLI-internal portal to the FLI Data Archive (fiiDA). Last accessed: 2024-03-19. <https://fiiida.leibniz-fli.de>

**Separate
raw and
processed
data**

The data **generated** at the source are (usually) stored **unchanged** in redundant form (see below) and archived in such a way that they can be retrieved without difficulty by the persons authorized to do so. Further **processing** steps are performed (exclusively) on **working copies** and documented.

The process from the acquisition of raw data to its processing and presentation in research outputs must be **seamlessly traceable**. It must be possible to match all process steps to the respective persons carrying them out.

4.5. THE USE OF RESEARCH DATA

At the earliest possible stage of a research project involving FLI staff, all parties involved shall enter into **written documented agreements** on the **rights and obligations** concerning the use of their own and third-party research data, which shall also apply beyond the period of employment or qualification (e.g., for a master's or doctoral degree). The agreements should be reviewed regularly and updated as necessary.

**Agree-
ments**

Written documented agreements are particularly **necessary** if, in addition to FLI staff, persons from other academic and/or non-academic institutions are involved in a research project or in the event that FLI staff members leave and wish to continue using the data they have generated for (their own) research purposes (see ⇨ **Chapter 4.6**).

NOTE: The **use** of research data occurs, among other things, through storage, archiving, evaluation, interpretation, merging, selection, modification, transmission, duplication, destruction/deletion, withholding, sharing, making accessible, publication, or integration into simulations.

The use of research data within the scope of a **patent** is regulated by law (see FLI intranet site¹⁴).

The use of research data **may be restricted** or otherwise regulated by other laws, regulations, or agreements, e.g., for the handling of patient data or genetically modified organisms.

The use of research data for the **preparation** of a qualification thesis or other **research outputs** is particularly **granted** to the person who collects/generates them; if several persons are involved in the collection/generation of research data, their

¹⁴ Internal flyer of the FLI Core Facility Technology Transfer (PDF). Last accessed: 2024-03-19. http://www2.leibniz-fli.de/internals/forschungskoordination/TT_Flyer_en.pdf

respective shares in the collection/generation should be appropriately documented and made transparent.

Vacant data usage rights

If the staff member who collected/generated research data **voluntarily refrains** from using them for plausible reasons (“**abandoned**” data), the decision how to use them shall pass to the entity head; the abandonment shall be documented in writing. This waiver shall be retained with the research data.

If the staff member who collected/generated research data does not issue a statement on the further use of the research data even after sufficiently intensive search or inquiry (“**orphaned**” data), the decision how to use them shall pass to the entity head or head of superordinate organizational unit; the procedure for the inquiry and its failure shall be documented in writing.

If a staff member who collected/generated research data dies before or during the intended use, the decision how to use data not protected by copyright law passes to the entity head.

NOTE: In all cases of use of the research data by others, the **regulations** of the respective **publication media** shall be considered, if applicable.

In the case of **licensing**, the procedures of the Technology Transfer Manual and the requirements of the Employee Inventions Act shall apply (see FLI intranet site¹⁴).

4.6. RETENTION OF RESEARCH DATA

All research data should be **retained** in accordance with the **3-2-1 backup** rule (see box) and be **protected** from tampering to the greatest extent possible. Exceptions must be justified and documented.

NOTE: 3-2-1 backup rule: All digital research data are to be cloned into two additional objectively identical copies (“clones”) as soon as possible after being generated. At least two clones must be stored on different media (analog-digital; different storage media, e.g., in the instrument and on a server next door, or on a computer and an external hard drive). One of the clones is stored in a remote location on the primary data management and archiving environment at the FLI fliDA.¹⁵

Minimum storage: 10 years

If primary data and processed data are **the basis for a qualification thesis or another research output**, these data, including their metadata and the research-related records, must be **retained for at least ten years** after public access is established or after the qualification date.

¹⁵ FLI-internal portal to the FLI Data Archive (fliDA). Last accessed: 2024-03-19. <https://fliida.leibniz-fli.de>

If research data are **subsequently used** for further publications or qualification work, the **retention period begins again** after public access has been established or after the qualification date.

If **longer** storage periods are prescribed by other **regulations** (e.g., by the Genetic Engineering Records Ordinance / Gentechnik-Aufzeichnungsverordnung), by regulations of funders or by cooperation agreements), then these apply.

If there are plausible reasons for a **shortened** retention period, these are clearly explained. The explanatory **document** (destruction/deletion protocol) is retained without a time limit.

After **expiry** of the minimum retention period, the research data can be retained for longer on one's own responsibility and in one's own interest (see ⇒ **Chapter 4.6**).

If research data are **not used** for publication or qualification work for plausible reasons, these data can be deleted or destroyed at the **earliest ten years after** the end of the **funding period** of the project in which they were generated.

If research **data** are **lost prior to the expiration** of the minimum retention period, an informal **loss protocol** will be prepared documenting the circumstances of the data loss. The loss protocol must be retained by the entity head for a period of at least **ten years** after the creation of the loss protocol in a manner that maintains transparency of the relationship to related data that have not been lost.

If research **data must be deleted** for important reasons (e.g., to protect the personal rights of test subjects), an informal **deletion protocol** is prepared. The deletion protocol must be retained by the entity head for a period of at least **ten years** after the creation of the deletion protocol.

NOTE: The process of (final) **archiving** of research data is governed by the “Rules for archiving publication-relevant data” (⇒ **Appendix H**) and the “‘How-To’ for archiving and external assessment before submission of publications and theses” (⇒ **Appendix I**).

4.7. ACCESS TO RESEARCH DATA AND RESPONSIBILITY FOR THEIR RECORDING, STORAGE, TRANSFER, AND ARCHIVING

In the context of an ongoing or completed research project, the authorized users also **decide** (in particular in accordance with data protection regulations) whether **third parties should have access** to the data. The decision is **documented** informally.

The employee **who collects the data is responsible** for the proper **recording**, organization, and storage of **digital research data** during their employment /

qualification period. Further information on responsibilities during the FLI-internal archiving process can be found in ⇒ **Appendix H**, as well as advice and requirements for data organization in ⇒ **Appendix I**.

Proper storage of **non-digital** research data (e.g., samples, materials) and their **transfer to the physical storage location** is the responsibility of the employee working with these data during his/her employment/qualification period.

These employees must be **appropriately instructed and supervised** for this purpose and the implementation must be reviewed at regular intervals. Instruction, supervision, and review must be documented in writing, e.g., in a note; these tasks may be delegated by the **entity head** to appropriate competent persons.

NOTE: Resources necessary for **record keeping and retention** shall be **provided** by the **FLI** and shall be the responsibility of the respective entity head.

Private copy

When a **new employee** joins the FLI, and **again before leaving**, they are **advised** by the entity head or delegated person that they may **create and take along a private copy** of their research data for their future use. For convenience, the personal copy should be created at regular intervals during the employment period (e.g., once a month) on suitable storage media.

For research data that **cannot or must not be copied** for plausible reasons (e.g., samples, very large data volumes, sensitive data), **access rights** are agreed upon and documented.

Handover

Before an employee of the FLI **leaves**, they must **hand over** or transfer the research **data** that they collected, generated, or processed and that need to be archived at the FLI, including a **handover protocol**¹⁶, to the entity head or a designated person.

NOTE: Research-relevant **communications** (emails, letters, etc.) are also **handed over**.

Private documentation such as research diaries (e.g., with conference transcripts) will **not** be **handed over**. It is recommended that the leaving person **preserves** them securely and permanently.

After the **departure** of an employee of the FLI, the **entity head is responsible** and accountable for the safe and permanent **storage** of the research data in the interests

¹⁶ Handover protocol (knowledge transfer file) example: Julie Goldman *et al.* (2024). Research Management Resources. Knowledge Transfer File Template (PDF). Last accessed: 2024-03-19. <https://osf.io/c7xmv/>; (DOCX). Last accessed: 2024-03-19. <https://osf.io/pw7ed/files/osfstorage/65f84fe53abfb3027f8b8d5a/>; (XLSX). Last accessed: 2024-03-19. <https://osf.io/pw7ed/files/osfstorage/621539f548328a04e944d6f2/>

of the involved persons and institutions for the purpose of verifiability and traceability of the research process and the (possible) research outputs.

After **dissolution of a research group**, the **head of the superordinate organizational unit** assumes responsibility for the permanent and secure storage of the research data.¹⁷

¹⁷ FLI-Website: Organizational Structure of the FLI. Last accessed: 2024-03-19. <https://www.leibniz-fli.de/institute/organization>

5. RESEARCH OUTPUTS

5.1. PRINCIPLES OF GRP FOR PUBLICATIONS

Open Science

The findings obtained in research projects at the FLI are generally **made publicly available** unless there are good reasons for not doing so. These are to be documented in a comprehensible manner.

It is recommended that **manuscripts** be published in advance on a **preprint** server (e.g., BioRxiv¹⁸). Before uploading, the **FLI publication process** must be followed (see ⇨ **Appendix G**).

Transparency, comprehensibility, and completeness in the research output must be of such an extent that research results or **findings can be replicated**/rechecked by others.

All own and external **preliminary work is documented** truthfully and traceably (see criteria in ⇨ **Appendix B**).

The **origin of the data** (digital, analog, physical; samples, materials, software, etc.) is **identified**.

Original sources must always be **cited**; secondary citations are to be avoided. For this purpose, all sources must already be appropriately documented in the preceding research process.

Visual representations of data in graphics, figures, tables, pictures, etc. must be easily, immediately, and unambiguously **understandable**, supplemented by suitable **explanations** in text form if necessary. **Peacocking**, i.e., the exaggerated or misleading presentation of certain statements, is to be **avoided**. Visual representations are **accompanied** by all relevant and applicable **details**, e.g., number of independent experiments; number of cells, of organelles, of animals analyzed; genetic background; genotype; age; staining methods; scale bar. To be mentioned is also the type of the statistical test used, description of error bars (SD, SEM, etc.).

If possible, research **data** (e.g., OMICS data) on which a publication is based are **made available** in recognized **repositories** in accordance with FAIR principles. See examples in ⇨ **Appendix A.5**.

¹⁸ Cold Spring Harbor Laboratory. BioRxiv, The Preprint Server for Biology. (Website). Last accessed: 2024-03-19. <https://www.biorxiv.org>.

It is recommended that **all** research **data** on which a publication is based be consolidated and made **available to all authors**.

Even **findings** that **contradict** the leading research question, the hypothesis, or recognized bodies of knowledge (so-called “**negative results**”) are to be **published**.

Junior researchers should be given the opportunity to **write manuscripts** independently and with supervision, and to carry out the **publication** process.

Post- publication corrections

If authors have made findings publicly available and **subsequently** become aware of **discrepancies or errors**, these must be **corrected immediately** by means of a “**correction**” or “**erratum**” using the procedure provided by the **publication medium**. If the discrepancies or errors should result in the retraction of a publication, the authors must work with the relevant publisher or infrastructure provider as quickly as possible to ensure that the retraction takes place and is marked accordingly (“**retraction**”). This applies particularly if the authors are informed of such discrepancies or errors by third parties.

5.2. PUBLICATION MEDIUM AND AUTHORSHIP

The **publication medium** – journal, conference proceedings, repository, etc. – is **carefully selected** by the authors. General **criteria** for the selection of the publication medium are outlined in ⇨ **Appendix D**.

The selected medium should have its **own established standards of good research practice**. These are to be adhered to as a matter of principle.¹⁹ There is to be **no** publication in “**predatory journals**”. For the **identification** of such journals see ⇨ **Appendix E**.

An employee of the FLI **can only become** an **author** of an original scientific **publication** if he/she has personally **contributed significantly** to the research **process and** the research **output**, i.e.,

- to the **conception** or **design** of the work; or to the **acquisition, analysis, or interpretation** of data for the work;
- and to **drafting** the work or **revising** it critically for important intellectual content.

Furthermore, the employee must

- **approve** of the publication of the text

¹⁹ Committee on Publication Ethics. (Website). Last accessed: 2024-03-19. <https://publicationethics.org>.

- and agree to be **accountable** for the publication and the preceding research process.

In particular, the **following** contributions **do not qualify** for authorship (so-called "**honorary authorship**"):

**No
authorship
for:**

- merely **organizational responsibility** for obtaining the **funds** for the research,
- providing **standard** investigation **material**,
- the **training** of staff in **standard methods**,
- merely **technical** work on data **collection**,
- merely **technical support**, such as only providing **equipment** or experimental **animals**,
- regularly **providing datasets only**,
- only **reading** the manuscript **without** substantial **contributions** to its content,
- **directing an institution** or working unit in which the publication originates.

If a staff member of the FLI refrains from using her/his data in the context of a publication for plausible reasons ("**abandoned data**") and thus does **not wish to become an author**, this renunciation is **documented** in writing and the renunciation document (waiver) is kept together with the research data.

If a (former) staff member of the FLI who is entitled to authorship has **not made any claims** regarding his or her cooperation in the preparation or critical revision of a publication ("**orphaned data**"), even after sufficiently intensive **inquiry**, the failure of the search will be **documented** in writing in a traceable manner. The (former) staff member will not be an author but should be acknowledged.

In **both cases**, the use of the research data is **regulated in** ⇒ **Chapter 4.4**. The particularities of the respective publication media for the publication of abandoned or orphaned research data are to be considered.

All authors shall fully and truthfully **describe** their **contributions** to the research process and the research output.

To avoid conflicts over authorship, those involved in the research project **communicate** about their **expectations** and **experience regarding authorship** at the **beginning** and as needed. They agree on a **procedure** for determining authors according to the valid criteria for authorship and **document** their **agreements** in writing (see ⇒ **Appendix F**).

**Order of
authors**

Regarding the sequential **order of authors**, the respective **conventions** of the subject disciplines involved should be considered. Particularly when authors from different subject **cultures** cooperate, the agreement reached at the beginning of the collaboration should also include a procedure for determining the order of authors.

NOTE: During the project, the participants shall prepare a **list of all contributors** and update it regularly.

Prior to writing a multi-author manuscript, the participants will **discuss and agree** on **whose** research **contributions will be represented** in the manuscript and **how**, and what portions of the text will be **written by whom**. The order of authors is determined according to the agreement.

When **contributions** are of **similar significance**, "**shared authorship**" should be considered, especially for prominent positions on the author list. In the context of **cumulative doctorates**, the relevant doctoral **regulations** should be consulted.

If, in the writing process or during the review of the manuscript, **contributions** of authors are **removed, become more significant**, or are **added**, this is discussed by the parties involved, **consensus** on the change is **documented**, and the **list** of authors is **adjusted** accordingly, if necessary. The procedure for changes to the list of authors after submission is governed by the guidelines of the publication medium.

The final **list**, including the names of the **authors** and those mentioned in the **acknowledgements**, is mutually **agreed** upon **prior to submission**. This shall be suitably **documented**.

If a FLI staff member **does not meet the criteria for authorship** in a research project, he or she should be mentioned in the **acknowledgement**. The guidelines of the respective publication medium are to be followed.

NOTE: As a rule, a mention in the **acknowledgement** should only be made with the **consent of the named person**.

Consent to publication by an author **may not be withheld or delayed (obstruction) without scientific justification**. Refusal or delay of consent must be justified by a **verifiable criticism** of data management, documentation of the research process, or any component of the manuscript (data, methods, figures, literature, text components, results, etc.).

Affiliations

When citing **affiliation(s)**, the guidelines of the publication medium must be followed.

The **FLI** is named as an affiliation if the **majority** of the research **work** was done at the FLI. The decisive factor for affiliation is the fulfillment of the criteria for authorship. This is the case, for example, if the research data used for the publication were collected at the FLI. The FLI is also cited as an affiliation if a departed employee publishes research data collected at the FLI in a position at another institution.

If data collected at **another institution** are **published by an employee** of the **FLI**, the other institution is named as an affiliation. The FLI is given as “**current address.**” See also the guidelines of the German Rectors’ Conference, the HRK.²⁰

Multiple affiliations are **possible**, e.g., for PhD candidates or for employees of the FLI who have another institute affiliation.

5.3. MISCONDUCT IN THE PUBLICATION PROCESS

Misconduct in the publication process **includes** the following:

Duplication issues

- the splitting of research data to produce multiple publications (“**salami slicing**”);
- **duplicate** and multiple publications (unless well justified, permitted by the rules of the publisher or journal, and made transparent; e.g., after invitation for second publication, pre-publication on preprint servers, or by translation into a more common language with reference to the original publication);
- the **simultaneous submission** of the same manuscript to more than one publication medium, if this is prohibited by regulations of the publisher;

Authorship issues

- so-called “**honorary authorship**,” in particular authorship obtained by collusion (“**authors’ club**”) or reference to tradition (“default authorship”), or forced by abuse of power (“**coercive authorship**”);
- the **denial of authorship**, in the case that substantial contributions were made to the planning or execution of a scientific research project;
- submitting or **publishing** a manuscript **without** first having obtained the explicit **consent of all authors**;
- the **alteration** of an agreed **list of authors** without consent of all authors;
- naming a known researcher as an author to increase the likelihood of acceptance of the manuscript (“**author doping**”);
- **purchasing authorship** of texts offered by “**paper mills**”²¹ or selling professional articles to them;
- the unjustified delay or prevention of the publication of a scientific paper (**obstruction**);

²⁰ German Rector’s Conference (HRK). Recommendation on guidelines for stating affiliations in publications. (Website). Last accessed: 2024-03-19. <https://www.hrk.de/resolutions-publications/resolutions/beschluss/detail/recommendation-on-guidelines-for-stating-affiliations-in-publications/>

²¹ Christopher J. (2021). The raw truth about paper mills. FEBS Letters 595. 1751–1757. <https://doi.org/10.1002/1873-3468.14143>.

**Other
boosting
issues**

- **unjustified self-citation**, participation in a **citation cartel**, or other **manipulations of literature lists** as author, reviewer, or editor (e.g., to increase impact factor);
- publication in a **predatory journal**;
- naming as an **affiliation** an institution that does not meet the criteria for affiliation;

**Review
issues**

- **manipulation** of the **review** process, e.g., through courtesy reviews or unjustified rejection of manuscripts as a reviewer or editor;
- **collusion** between author, reviewer, and/or editor for the purpose of manipulating the publication process;
- the review of one's own manuscript, e.g., by pretending to be someone else (**self-review**);
- knowingly **participating** as a reviewer or editor of a **predatory journal**;
- **concealing conflicts** of interest;
- **accepting** a peer review **despite** the existence of a concealed **conflict** of interest;
- conducting a peer **review without** sufficient **expertise**;
- **delegating a review** to a third party **without** the prior **consent** of the editor;
- the **exploitation** of data of others as a reviewer or editor (e.g., by **stealing** ideas, results, or conclusions);

Theft

- the **unauthorized publication or release** to third parties of a work, finding, hypothesis, teaching, or research approach that has not yet been published in the manner customary in the profession.

5.4. PROCEDURE BEFORE THE SUBMISSION OF MANUSCRIPTS AT THE FLI

FLI-specific

Prior to submission, manuscripts of research outputs must be **prepared and checked** in accordance with the “**How-To’ for archiving and external assessment before submission of publications and theses**” (see ⇨ **Appendix I**) and the “**Rules for PhD thesis submission**” (see ⇨ **Appendix K**) or the “**Rules for publishing research articles**” (see ⇨ **Appendix G**).

6. EVALUATION AND PEER REVIEW

Before accepting an evaluation or a peer review by an employee of the FLI, the employee must carefully **check** whether **competing interests** exist. If the competing interests make a neutral and objective review difficult (e.g., because of a close personal acquaintance with one of the authors), the request for evaluation/peer review must be **rejected**.

Evaluations and peer reviews may only be carried out by persons **qualified** to do so.

Review training

Junior researchers should be given the opportunity to **learn** how to peer review manuscripts **under supervision**. Usually, **permission** to do so must be **obtained from the editor in advance**.

To **prepare** for the first peer review by a junior researcher, he or she should make use of a **training course** or the online learning programs of the major publishers, e.g., Springer Nature²².

All assessments primarily follow **qualitative standards**. Quantitative indicators should only be included in the overall assessment in a differentiated and reflected manner.

²² Springer Nature. (2023). How to Peer Review. (Website). Last accessed: 2024-03-19.
<https://www.springernature.com/gp/authors/campaigns/how-to-peer-review>.

7. RESEARCH SUPPORT AND PROMOTION OF JUNIOR RESEARCHERS

All participants in the research process are **entitled to supervision and support**.

All participants in the research process are entitled to support for their own **independence** and **career opportunities**.

Additional guidelines

More detailed **information** for PhD candidates and postdocs can be found in the Leibniz Graduate School on Aging (**LGSA Training Guidelines**) and in the **Career Development Guidelines** for postdoctoral fellows (see the LGSA Training Guidelines²³ and Postdoc Guidelines²⁴).

All participants in the research process should **provide regular communication** about the **progress** of their research projects. The **frequency** of formal discussions should be in line with the respective **needs** of the participants and the progress of the research process.

NOTE: Notes of all formal discussions (e.g., between cooperation partners or between supervisor(s) and supervisee; see e.g., chapter 7 of the LGSA Training Guidelines²³) shall be taken and **stored**. If the content of the conversation **relates to a publication or qualification thesis**, the notes must be preserved for **at least ten years after** the publication/qualification date.

Entity heads should create **conditions** for successful **cooperation** of all members of the work unit. The entity head may **delegate tasks** to competent persons after instruction has been given and with appropriate guidance and supervision; management **responsibility**, on the other hand, **cannot be delegated**.

All FLI staff involved in research or research coordination are **required** to attend **regular GRP training**.

PhD candidates must conclude a **supervision agreement** (template in the LGSA Training Guidelines²³) with the supervisor/entity head and the LGSA. Such an agreement is also recommended for master students.

²³ Leibniz Graduate School on Aging (LGSA). (2019). LGSA Training Guidelines (PDF). Last accessed: 2024-03-19. http://www2.leibniz-fli.de/internals/phd/LGSA_Training_Guideline_Package.pdf

²⁴ FLI-internal document. (2019). Career development guidelines for postdoctoral fellows (PDF). Last accessed: 2024-03-19. http://www2.leibniz-fli.de/internals/phd/Postdocs/Postdoc_Guideline.pdf

FLI staff members pursuing a scientific **qualification** are obliged to carefully read the respective **examination** regulations, **doctoral** regulations, or **habilitation regulations** of their faculty. In the event of any ambiguities, the office responsible for examinations, doctorates, or habilitations must be consulted.

8. OMBUDSPERSONS AT THE FLI

Ombudspersons are a crucial element in ensuring good research practice. Thus, and according to GRP recommendations and requirements, the FLI commits to deploy ombudspersons.

Furthermore, the FLI is committed to **support** ombudspersons in their **qualification and training** to be prepared to fulfil their functions of confidential advising and impartial mediation.

8.1. ELECTION OF OMBUDSPERSONS

Employed scientists and technical staff of the FLI **elect two ombudspersons** from among the **scientists with doctorates and with a permanent contract**, and from two different entities. At least **one** ombudsperson should be a **woman**. Ombudspersons may **not** be members of the **institute management**. The board of directors of the FLI is **responsible** for conducting the **secret election**. The **term of office** of the ombudspersons is **four years**. Re-election is possible once. Employees are notified of the incumbent ombudspersons, and they are announced on the institute's internal website.

If it **no longer** appears **possible** for an ombudsperson to reliably **fulfill his or her duties** in the long term, or if confidence in the proper fulfillment of duties is no longer justified, an ombudsperson may be **voted out of office**. An ombudsperson is voted out if at least **2/3 of the scientists and technical staff** of the FLI agree. **Before** the scientific director of the FLI schedules a **deselection**, the ombudsperson must be given the opportunity to make a statement (**hearing**). The **reasons** for the voting out and the hearing of the ombudsperson concerned must be **recorded in writing**.

8.2. TASKS OF THE OMBUDSPERSONS

As neutral contact persons, the ombudspersons **advise** current and former employees of the FLI on matters of good research practice. They also have the task of **receiving** possible **allegations of scientific misconduct** in confidence and, if necessary, passing them on to the investigative body (see ⇒ **Chapter 10**). All ombudsperson matters are **subject to confidentiality**, which must be maintained by all parties involved **even after the conclusion** of a procedure.

Impartial mediators

The ombudspersons of the FLI do not have formal rules of procedure, but are guided by the principles of **confidentiality**, procedural **fairness**, and **transparency** for the parties involved. **Conflict resolution** is pursued – as far as possible – in **consensus**

with the parties involved and with the aim of finding a mutually agreeable solution for all parties involved (**mediation**) and in compliance with good research practice.

The ombudsperson **submits allegations** of scientific misconduct **to a preliminary examination**. If this gives rise to a concrete initial **suspicion** of scientific misconduct (see ⇒ **Chapter 9**), a **procedure** for dealing with scientific misconduct is **initiated** (see ⇒ **Chapter 10**).

NOTE: Ombudspersons may also **address indications** of scientific misconduct on their **own initiative**, without having to disclose the identity of a whistleblower to third parties.

It is **not the task** of the ombudspersons to **determine** academic misconduct or to **impose sanctions**.

8.3. ADVICE SEEKERS, WHISTLEBLOWERS, AND ACCUSED PERSONS

Anyone who has a **concern or question** regarding good research practice (**advice seeker**), who suspects scientific misconduct (**whistleblower**), or who is accused of scientific misconduct (**accused person**) **can contact** one of the ombudspersons of the FLI at any time.

Staff from the research group of an ombudsperson contact the ombudsperson who is **not a member of their own research group**.

NOTE: Staff of the FLI also have the right to turn to the supra-regional body “**German Research Ombudsman**”²⁵ or the **Central Ombuds Committee of the Leibniz Association**²⁶. Members of a university working at the FLI may contact the **ombudspersons of their university**. The **simultaneous** notification of several ombuds bodies is to be **avoided**.

A **whistleblower’s report** of possible scientific misconduct must be made in **good faith**. Allegations must not be made without **verification** and without sufficient **knowledge of the facts**. **Careless** handling of allegations of scientific misconduct, and even more so the making of **deliberately incorrect** allegations, may **constitute** a form of scientific **misconduct**.

NOTE: **Anonymous** reports are always possible.

²⁵ Ombudsman für die Wissenschaft. (2024). The German Research Ombudsman. (Website). Last accessed: 2024-03-19. <https://ombudsman-fuer-die-wissenschaft.de/?lang=en>

²⁶ Leibniz Gemeinschaft. Good Scientific Practice and Ombuds Services. (Website). Last accessed: 2024-03-19. <https://www.leibniz-gemeinschaft.de/en/about-us/leibniz-integrity/good-scientific-practice-and-ombuds-services>

The **names** of all persons involved are treated **confidentially** by the ombudspersons of the FLI. In **exceptional** cases, **disclosure** of the whistleblower's or advice seeker's name **may be necessary**, e.g., if the person concerned cannot otherwise defend him/herself properly, or if damage to the FLI cannot be averted otherwise. However, this will not happen without prior consultation with the whistleblower / advice seeker.

The **facts discussed** with an ombudsperson of the FLI are to be treated **confidentially** by all parties involved. A **violation** of this obligation may constitute a form of scientific **misconduct**.

Whistle-blower protection

To **protect** themselves, whistleblowers can **express a suspicion** of misconduct in the **form of a question** about good research practice during the initial contact with an ombudsperson. It is advisable to **consult** an ombudsperson **sooner** rather than too late; an erroneous suspicion can thus be dispelled without coming to the attention of third parties, and misconduct can possibly be prevented. If **several employees** of the FLI have the same suspicion, they can go to the ombudsperson **together**; in this case, the obligation of confidentiality among each other does not apply.

Whistleblowers who report their suspicions of possible scientific misconduct to the relevant institution perform an **essential function for self-regulation in science**. It is not the whistleblower who expresses a justified suspicion who damages research and the institution, but the researcher who is guilty of misconduct. Therefore, a **whistleblower's career** should **not be disadvantaged**, or academic progress hindered by a disclosure. Particularly for early career researchers, a report of this nature should **not result in delays or obstacles** during their education; there should be **no disadvantage** to their final dissertations and doctorate; this applies also to **working conditions** and to possible extensions to their **contracts**.

The **protection** of whistleblowers is ensured at the FLI by the **ombudspersons**, the **Panel for the Investigation of Allegations of Scientific Misconduct** at the FLI (see ⇒ **Chapter 10**), and the **Scientific Director** or the **Chair of the Scientific Advisory Board**.

9. SCIENTIFIC MISCONDUCT

Scientific **misconduct occurs** when the **standards** of good research practice are **violated intentionally** or through gross **negligence**. This includes particularly the violation of **ethical standards**, **misrepresentation** and **manipulations**, disregard for the **intellectual property** of others, and **interference** with or **obstruction** of the research activities of others.

Scientific misconduct exists particularly in the case of:

Misrepresentation

1. **Misrepresentation** of information through Misrepresentation
 - a. **fabricating** data, sources, research hypotheses;
 - b. **falsifying** data and sources, e.g., by
 - i. **suppressing** sources, data, documents, or texts relevant to the research questions,
 - ii. **manipulation** of sources, data, representations, or figures,
 - iii. **cherry-picking** results and discarding undesirable findings without disclosure;
 - c. **incorrect** information in an **application letter or grant proposal** (including false information about the publication medium, publications submitted and/or in print, qualification work supervised, participation of third parties, etc.);
 - d. **incorrect** information on the scientific **achievements of applicants** in selection or review committees;
 - e. **concealment of conflicts** of interest;

Intellectual property

2. Infringement of **intellectual property**
 - a. with respect to a **copyrighted** work created by another person or
 - b. essential scientific knowledge, hypotheses, teaching, or research approaches originating from another person through
 - i. unauthorized use under presumption of authorship (**plagiarism**),
 - ii. unauthorized use of research approaches and ideas, especially in or after the review process (**theft of ideas**),
 - iii. **unauthorized use of contributions** from bachelor's and/or master's theses,
 - iv. **usurpation** of scientific **authorship** or co-authorship without own scientific contribution,
 - v. **falsification** of the content, e.g., through the arbitrary omission or addition of results and/or information relevant to the subject matter,

- vi. **unauthorized publication** or release to third parties as long as the work, finding, hypothesis, teaching content, or research approach has not yet been published,
- vii. **claiming (co-)authorship** of another person's work without that person's knowledge or consent,
- viii. **other** violations of good research practice in the publication process (see chapter 5.3).

Authorship

- 3. Passing off work written by another person as one's own and/or actively participating in a **misstatement of authorship**.

Inter- ference

- 4. **Interfering with or impeding** the research activities or qualification opportunities of others, e.g., through
 - a. **sabotage** of another person's research activities by
 - i. **damaging, destroying, removing, or manipulating** experimental setups, equipment, records, hardware, software, chemicals, or other materials needed by another person to conduct his or her research,
 - ii. malicious **misappropriation or theft** of books, archival records, manuscripts, data sets,
 - iii. intentionally **rendering** scientifically relevant **material**, such as information carriers, **unusable**,
 - iv. **deletion** of data, if this would violate legal regulations, recognized principles of scientific work, regulations of the respective institution, or these Guidelines,
 - v. arbitrarily **delaying the publication** of a scientific paper, especially as an editor, reviewer, or co-author,
 - vi. **unauthorized destruction or unauthorized sharing** of research material;
 - b. **violation of supervisory duties**;
 - c. **termination of scientific collaboration** without sufficient reason or prevention of the publication of research results as a co-author, especially if the other authors are dependent on the consent for publication. **Refusal to give the required consent for publication** constitutes misconduct if there are no sufficient factual reasons for the refusal ("**obstruction**"). In such cases, the publication of the data can also take place without the consent of the co-author terminating the scientific collaboration and after **approval by the ombudspersons**²⁷, if there are no copyright reasons to the contrary.

²⁷ Deutsche Forschungsgemeinschaft. (1998). Sicherung guter wissenschaftlicher Praxis. Denkschrift. Weinheim: Wiley-VCH; pp. 31, 83f.

Obstruction

5. **Refusal to cooperate** or deliberate delay **in clarifying** scientific **misconduct**, e.g., in the context of an ombuds procedure or a formal investigation procedure.

Shared responsibility

Shared responsibility for misconduct may result from, among other things,

1. active **participation** in the misconduct of others,
2. being **aware** of scientific misconduct of others without taking or initiating appropriate action,
3. **co-authorship** of publications containing fraudulent material, and
4. grossly **neglecting supervisory duties**.

10. PROCEDURE AT THE FLI IN THE EVENT OF SUSPECTED SCIENTIFIC MISCONDUCT

In the event of justified **initial suspicion** of scientific misconduct, the **ombudsperson informs** the **Scientific Director** of the FLI. **If** the Scientific Director is **affected** by the suspicion, the **Chairperson** of the Scientific Advisory Board will be informed. The informing of the Scientific Director or the Chairperson of the Scientific Advisory Board usually takes place in a **written** form; in the event of being informed orally, the Scientific Director or the Chairperson of the Scientific Advisory Board prepares a written note.

Responsible bodies

The Scientific Director or the Chairman of the Scientific Advisory Board **commissions the Panel for the Investigation of Allegations of Scientific Misconduct** at the FLI to further examine the facts of the matter.

The **Panel for the Investigation** of Allegations of Scientific Misconduct at the FLI consists of the **legal counsel**, the respective other **ombudsperson** (not the one initiating the investigation), and the **research integrity officer** of the compliance management system. For the clarification of facts, professionally qualified **experts can be consulted**. Such investigations shall be conducted with due regard for **confidentiality** and the **protection** of all parties involved.

The **panel is entitled to obtain** all **information** and **opinions** necessary to clarify the facts of the case, while safeguarding the legitimate interests of the persons concerned, and shall examine whether scientific misconduct has occurred in the light of independent evidence.

Protections

The **person affected by the suspicion** of misconduct shall be given the opportunity to **comment**, with reference to the incriminating facts and evidence. A **deadline** shall be set for the submission of a **written statement**. The **identity of a whistleblower** shall **not be disclosed** to the person concerned without his or her consent at this stage of the procedure.

The panel shall adhere to the basic principle of the **presumption of innocence** vis-à-vis the person concerned at every stage of the proceedings within the framework of a case-by-case consideration, until proven otherwise. As a matter of principle, the person affected by the allegations should not suffer any adverse consequences from the investigation into the suspicion until scientific misconduct has been formally established.

After completion of the investigation, the committee **reports** the results of the investigation in writing to the Scientific Director or the Chair of the Scientific Advisory

Board. Based on the report received, the Scientific Director or the Chair of the Scientific Advisory Board, shall **decide** within a reasonable time as to **whether** the findings by that point have **invalidated** the suspicion of misconduct, whether **further investigation** is necessary, **or** whether misconduct is to be **considered proven**. This decision shall be set forth in writing in a **memorandum**. This report, in particular in accordance with the “Guidelines for Good Scientific Practice in the Leibniz Association” (**Leibniz Guidelines**)²⁸, should do the following:

- a) present and evaluate the **extent** of such scientific misconduct; and
- b) establish and substantiate whether such conduct was **negligent**, grossly negligent, or **deliberate**; and
- c) determine whether a **sanction** is appropriate and should be implemented (see chapter 11).

The individual steps should be completed **without avoidable delay** or within the specified time limits and should be accurately **recorded and documented**.

Further relay

If, in the course of a case, it becomes apparent that a **final clarification** of the allegations by the FLI **is not possible** or that the proceedings are impeded by extraordinary circumstances, the ombudsperson of the FLI shall, according to §4(2) of the Leibniz Guidelines, **submit the case** in written form according to §5(1) of the Leibniz Guidelines **to the central ombudsperson of the Leibniz Association**, who shall take over the proceedings according to §5(2)–(6) of the Leibniz Guidelines. Within the framework of this procedure, the central ombudsperson may, in accordance with §5(5) of the Leibniz Guidelines, decide on the necessity of setting up an investigation committee, which, in accordance with §5(7) of the Leibniz Guidelines, shall be appointed by resolution of the Presidium of the Leibniz Association.

After **completion** of the investigation procedure, the ombudsperson and the investigation committee shall **advise any persons** who may have been **involved** in processes of scientific misconduct through no fault of their own, particularly junior researchers and students, on **how to safeguard their** personal and scientific **integrity**.

²⁸ Leibniz Gemeinschaft. (2019). Guidelines for Good Scientific Practice in the Leibniz Association (PDF). Last accessed: 2024-03-19. https://www.leibniz-gemeinschaft.de/fileadmin/user_upload/Bilder_und_Downloads/Über_uns/Integrität/Guidelines_for_Good_Scientific_Practice_in_the_Leibniz_Association.pdf

11. CONSEQUENCES OF SCIENTIFIC MISCONDUCT

Personal

- (1) If scientific misconduct is to be considered **proven**, the Scientific Director or the Chairperson of the Scientific Advisory Board, as the case may be, shall **decide** on the necessity of **further measures**, if necessary by obtaining legal expertise. Depending on the circumstances of the individual case and in particular the seriousness of the misconduct established, **sanctions** from a wide variety of legal areas are **possible**, also cumulatively if applicable, e.g.:
- a. consequences under **labor law**:
 - i. **warning**,
 - ii. extraordinary or ordinary **dismissal**,
 - iii. **termination of contract**;
 - b. **academic consequences**:
 - informing universities of serious scientific misconduct in connection with the acquisition of an academic qualification, so that the university can **revoke the doctoral degree or teaching authorization** if applicable;
 - c. consequences under **civil law**:
 - i. imposing a **ban** from the premises,
 - ii. claims for **restitution** against the person concerned, for example for the return of stolen scientific material,
 - iii. claims for **removal** (e.g., of published results) and injunctive relief under copyright law, personal rights law, patent law, competition law,
 - iv. claims for **repayment**, e.g., of scholarships or third-party funds,
 - v. claims for **compensation** by the Institute or third parties;
 - d. consequences under **criminal law**;
 - e. **retraction** of scientific publications.

Research

- (2) **Manuscripts** that are **erroneous** due to proven scientific misconduct must be **withdrawn** if they are still unpublished and **corrected or retracted** if they have already been published. **Cooperation partners** are to be **informed** in an appropriate manner, if necessary. The author(s) and editor(s) involved are obliged to do so.

Institutions and the public

- (3) In cases of serious scientific misconduct, the Scientific Director or the Chair of the Scientific Advisory Board shall **inform other affected research institutions** or research organizations, including professional organizations if necessary.
- (4) The Scientific Director or the Chair of the Scientific Advisory Board may be obliged to **inform affected third parties and the public** to protect third parties, to maintain confidence in scientific honesty, to restore the FLI's scientific reputation, to prevent further consequences, and in the public interest.

CLAUSES

SEVERABILITY CLAUSE

Should a provision of these Guidelines be or become **void or unenforceable**, whether in part or in its entirety, the **validity of the other** provisions included in these Guidelines **remain unaffected**. In place of the void or unenforceable provision, a new provision that comes closest to reflecting the spirit and purpose of the Guidelines should be considered as agreed upon. The same applies if a loophole is found in the Guidelines.

ENTRY INTO FORCE

The Guidelines were **approved by the board of directors of the FLI** on May 2nd 2023 and **entered into force on May 2nd 2023**. Please make sure to use the most current version (see ⇒ [Version History](#)) of this living document.

These Guidelines are a component of the rules of good research practice in line with the corresponding provisions of the employment contract.




APPENDIX

A — LINKS TO DOCUMENTS AND PORTALS




Last Update 2024-03

1. GOOD RESEARCH PRACTICE, RESEARCH INTEGRITY, OPEN SCIENCE, AND GENERATIVE ARTIFICIAL INTELLIGENCE


Some documents are available only in German.

Title, Source, Link	QR Code
<p>DFG Code of Conduct (2019)</p> <p>Deutsche Forschungsgemeinschaft. (2022). Guidelines for Safeguarding Good Research Practice. Code of Conduct. Zenodo. https://zenodo.org/doi/10.5281/zenodo.3923601</p>	
<p>DFG Memorandum Safeguarding Good Scientific Practice (2013)</p> <p>Deutsche Forschungsgemeinschaft. (2013). Memorandum Sicherung guter wissenschaftlicher Praxis / Safeguarding Good Scientific Practice. (PDF). Last accessed: 2024-03-19. https://onlinelibrary.wiley.com/doi/pdf/10.1002/9783527679188</p>	
<p>Leibniz Code for Good Research Practice (2021)</p> <p>Leibniz Gemeinschaft. (2021). Leibniz Code for Good Research Practice. (PDF). Last accessed: 2024-03-19. https://www.leibniz-gemeinschaft.de/fileadmin/user_upload/Bilder_und_Downloads/Über_uns/Gute_wissenschaftliche_Praxis/Leibniz_Code_for_Good_Research_Practice.pdf</p>	
<p>Leibniz Guidelines für Good Scientific Practice (2019)</p> <p>Leibniz Gemeinschaft. (2019). Guidelines für Good Scientific Practice in the Leibniz Association. (PDF). Last accessed: 2024-03-19. https://www.leibniz-gemeinschaft.de/fileadmin/user_upload/Bilder_und_Downloads/Über_uns/Integrität/Guidelines_for_Good_Scientific_Practice_in_the_Leibniz_Association.pdf</p>	








Title, Source, Link	QR Code
<p>Singapore Statement on Research Integrity (2010)</p> <p>World Conferences on Research Integrity. (2010). Singapore Statement on Research Integrity. (Website). Last accessed: 2024-03-19. https://wcrif.org/guidance/singapore-statement</p>	
<p>Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations (2013)</p> <p>World Conferences on Research Integrity. (2013). Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations. (Website). Last accessed: 2024-03-19. https://wcrif.org/guidance/montreal-statement</p>	
<p>Hong Kong Principles for Assessing Researchers (2019)</p> <p>World Conferences on Research Integrity. (2019). Hong Kong Principles for Assessing Researchers. (Website). Last accessed: 2024-03-19. https://wcrif.org/guidance/hong-kong-principles</p>	
<p>Guideline for Risk Management in International Scientific Cooperation of the Leibniz Association (2021)</p> <p>Leibniz Gemeinschaft. (2021). Guideline for Risk Management in International Scientific Cooperation of the Leibniz Association. (PDF). Last accessed: 2024-03-19. https://www.leibniz-gemeinschaft.de/fileadmin/user_upload/Bilder_und_Downloads/Über_uns/Internationales/Risk_management_in_international_scientific_cooperation.pdf</p>	
<p>Hochschulrektorenkonferenz – Gute wissenschaftliche Praxis an deutschen Hochschulen (2013)</p> <p>Hochschulrektorenkonferenz (2013). Gute wissenschaftliche Praxis an deutschen Hochschulen. (Website, German only). Last accessed: 2024-03-19. https://www.hrk.de/positionen/beschluss/detail/gute-wissenschaftliche-praxis-an-deutschen-hochschulen/</p>	
<p>ALLEA (All European Academies) The European Code of Conduct for Research Integrity (2017)</p> <p>ALLEA (2023). The European Code of Conduct for Research Integrity – Revised Edition 2023. Berlin. (PDF). DOI: 10.26356/ECOC. https://allea.org/portfolio-item/european-code-of-conduct-2023/</p>	

Title, Source, Link	QR Code
<p>Introduction to the UNESCO Recommendation on Open Science (2022)</p> <p>UNESCO and Canadian Commission for UNESCO. (2022). An introduction to the UNESCO Recommendation on Open Science. (PDF). https://doi.org/10.54677/XOIR1696</p>	
<p>Barcelona Declaration on Open Research Information (2024)</p> <p>Barcelona Declaration on Open Research Information, Kramer, Neylon & Waltman. (2024). Barcelona Declaration on Open Research Information (1.0). Zenodo. https://doi.org/10.5281/zenodo.10958522</p>	
<p>Living guidelines on the responsible use of generative AI in research (2024)</p> <p>European Commission. (2024). Living guidelines on the responsible use of generative AI in research. (PDF). Last accessed: 2024-03-19. https://research-and-innovation.ec.europa.eu/document/2b6cf7e5-36ac-41cb-aab5-0d32050143dc_en</p>	

2. PORTALS FOR PRE-REGISTRATION OF RESEARCH PROJECTS OR DATA MANAGEMENT PLANS







Title / Link	QR Code
<p>Center for Open Science</p> <p>(Website). Last accessed: 2024-03-19. https://www.cos.io/initiatives/prereg</p>	
<p>Animal Study Registry</p> <p>German Federal Institute for Risk Assessment. Animal Study Registry. (Website). Last accessed: 2024-03-19. https://www.animalstudyregistry.org/asr_web/index.action</p>	
<p>Preclinical Trials</p> <p>(Website). Last accessed: 2024-03-19. https://preclinicaltrials.eu</p>	
<p>Zenodo Repository</p> <p>European Organization for Nuclear Research and OpenAIRE. (2013). Zenodo. (Website / Repository). Last accessed: 2024-03-19. DOI: 10.25495/7GXX-RD71. https://zenodo.org</p>	







3. RESEARCH DATA MANAGEMENT (RDM)

Title / Link	QR Code
<p>RDM Intro Series: Coffee Lectures & Espresso Shots</p> <p>Wilbrandt J. (2023). Research Data Management Intro Series: Coffee Lectures & Espresso Shots. Zenodo. https://doi.org/10.5281/zenodo.7573694</p>	
<p>Forschungsdaten.info. (2023). Research Data and Research Data Management. (General overview)</p> <p>(Website). Last accessed: 2024-03-19. https://forschungsdaten.info/english-pages/</p>	
<p>Practical Guide for RDM (incl. DMP criteria)</p> <p>Science Europe. (2021). Practical Guide to the International Alignment of Research Data Management - Extended Edition. Zenodo. https://doi.org/10.5281/zenodo.4915861</p>	
<p>CESSDA RDM Guide</p> <p>CESSDA Training Team (2017 - 2022). CESSDA Data Management Expert Guide. Bergen, Norway: CESSDA ERIC. (Website). Last accessed: 2024-03-19. https://dmeg.cessda.eu/Data-Management-Expert-Guide</p>	
<p>RDMkit</p> <p>ELIXIR (2021) Research Data Management Kit. A deliverable from the EU-funded ELIXIR-CONVERGE project (grant agreement 871075). (Website). Last accessed: 2024-03-19. https://rdmkit.elixir-europe.org/</p>	
<p>Short RDM explainer videos</p> <p>Ghent University Open Science [UGhent Open Science]. (n.d.). Home [YouTube channel]. YouTube. Last accessed: 2024-03-19. https://www.youtube.com/@ugent_OS/videos</p>	
<p>Guide to Good Practice (Paper)</p> <p>Corti L. et al. (2014). Managing and Sharing Research Data: A Guide to Good Practice. Sage Publishing. https://doi.org/10.25607/OBP-1540 or directly the PDF: https://dam.ukdataservice.ac.uk/media/622417/managingsharing.pdf</p>	

There is additional information on RDM in the context of preparing data for archiving and publication in [⇒ Appendix I](#), especially on best practices regarding file and folder naming ([⇒ Links: File Naming](#)) and file formats ([⇒ Links: File Formats](#)).

4. DATA MANAGEMENT PLANS (DMPs)

Title / Link	QR Code
<p>Infos on DMPs by the Friedrich-Schiller-Universität Jena</p> <p>Friedrich Schiller University Jena. Research Data Management Helpdesk. Data Management Plan. (Website). Last accessed: 2024-03-19. https://www.researchdata.uni-jena.de/information/datenmanagementplan</p>	
<p>Infos on DMPs by the Harvard University</p> <p>Harvard Longwood Medical Area Research Data Management Working Group. Data Management Plans. (Website). Last accessed: 2024-03-19. https://datamanagement.hms.harvard.edu/plan-design/data-management-plans</p>	
<p>Example DMPs: Public DMPs of DMPonline</p> <p>Digital Curation Centre. DMPonline. Public Data Management Plans. (Website). Last accessed: 2024-03-19. https://dmponline.dcc.ac.uk/public_plans</p>	
<p>Example DMP: SAIL</p> <p>Barbosa and Karimova. (2023). SAIL Data Management Plan. Zenodo. https://zenodo.org/doi/10.5281/zenodo.4286209</p>	
<p>DMP Guide by HORIZON 2020</p> <p>European Commission. HORIZON 2020 Online Manual. Data Management. (Website). Last accessed: 2024-03-19. https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-data-management/data-management_en.htm</p>	
<p>DFG Checklist for DMPs</p> <p>Deutsche Forschungsgemeinschaft. (2021). Handling of research data. (PDF). Last accessed: 2024-03-19. https://www.dfg.de/resource/blob/174736/92691e48e89bf4ac88c8eb91b8f783b0/forschungsdaten-checkliste-en-data.pdf</p>	

Title / Link	QR Code
<p>OpenAIRE Guide for DMPs</p> <p>OpenAIRE. Guides for Researchers. Data Management Plans. (Website). Last accessed: 2024-03-19. https://www.openaire.eu/how-to-create-a-data-management-plan</p>	
<p>RWTH Aachen University Vorlage Datenmanagementplan (German only)</p> <p>Vorlage Datenmanagementplan für die RWTH Aachen University. (2016). (PDF). Last accessed: 2024-03-19. https://www.rwth-aachen.de/global/show_document.asp?id=aaaaaaaaaasvnen</p>	
<p>DMP tool: ARGOS</p> <p>OpenAIRE. ARGOS. (Website / Tool). Last accessed: 2024-03-19. https://argos.openaire.eu/splash/</p>	
<p>DMP tool: DMPtool</p> <p>California Digital Library. DMPtool. (Website / Tool). Last accessed: 2024-03-19. https://dmptool.org</p>	
<p>DMP tool: RDMO</p> <p>Leibniz-Institut für Astrophysik Potsdam (AIP). Research Data Management Organiser. (Website / Tool). Last accessed: 2024-03-19. https://rdmorganiser.github.io</p>	
<p>DMP tool: DSW</p> <p>ELIXIR CZ Research Infrastructure. Data Stewardship Wizard. (Website / Tool). Last accessed: 2024-03-19. researchers.dsw.elixir-europe.org</p>	

5. SELECTED REPOSITORIES

Title / Link	QR Code
<p>ProteomXchange</p> <p>(Website / Repository). Last accessed: 2024-03-19. http://www.proteomexchange.org</p>	
<p>NCBI Gene Expression Omnibus (NCBI GEO)</p> <p>(Website / Repository). Last accessed: 2024-03-19. https://www.ncbi.nlm.nih.gov/geo/</p>	
<p>European Nucleotide Archive (ENA)</p> <p>(Website / Repository). Last accessed: 2024-03-19. https://www.ebi.ac.uk/ena/browser/home</p>	
<p>Proteomics Identification Database (PRIDE)</p> <p>(Website / Repository). Last accessed: 2024-03-19. https://www.ebi.ac.uk/pride/</p>	
<p>Registry of Research Data Repositories (Re3Data)</p> <p>(Website / Repository). Last accessed: 2024-03-19. https://www.re3data.org</p>	
<p>Research Resource Identifiers (RRIDs)</p> <p>(Website / Repository). Last accessed: 2024-03-19. https://www.rrids.org/</p>	
<p>Protocols.io</p> <p>(Website / Repository). Last accessed: 2024-03-19. https://www.protocols.io/</p>	


B — CRITERIA OF APPROPRIATE DOCUMENTATION, RECORDING, STORAGE, AND ARCHIVING

To ensure the traceability of the research process and the research output, the associated **documentation** must be procured or carried out in accordance with the **following principles**:

Unaltered	Everything that is documented must be recorded authentically .
Complete	Everything that is relevant to the research process or research output is recorded according to the Five Ws + H (Who, what, when, where, why, and how). Generally, something that is not recorded never happened.
Timely	Documentation is done as quickly as plausibly possible so that nothing is forgotten or mistakenly falsified.
Regularly	Procedures that need to be repeated regularly should be done at plausible intervals .
Who?	The documentation is labeled with the name of the person documenting .
When?	The time of production, modification, transfer, destruction, etc. is documented.
Commented	The documentation is provided with explanations , if necessary (e.g. via a list of abbreviations, a README file or an explanation of a code/script).
Understandable	Professionals must be able to comprehend the content without difficulty.
Precise	The documentation must be unambiguous, accurate, and clear .
Detailed	All descriptions should be as detailed as necessary , but also as brief as possible .
Technical language	The documentation is written in German or English , if necessary, including special technical terms .

Legible	Handwritten documents must be readable and understandable by all participants and qualified third parties without any problems.
Secure	Sufficiently secured against loss, theft, destruction, and other unplanned or unforeseeable events.
Protected	Protected against loss of information or integrity (samples are stored in appropriate atmosphere, temperature, etc.; data on electronic media are to be protected against degradation and/or copied to new media on a regular basis).
3-2-1 Backup Rule	Present in at least three identical copies , two of which are on different media , one of which is in a remote location .
Witnessed	Confirmed with the necessary signatures by witnesses , e.g., provided with a manual or electronic signature after checking the laboratory notebook, instruction, data transfer, or similar.
Forgery-proof	The documentation is protected as well as possible against manipulation.
Final	Original data is kept unchanged ; all procedures are performed on copies only.
Structured	The documentation (files, folders, forms, etc.) is structured in a clear and orderly manner.
Standardized	If necessary, by using templates or predefined process schemas.
Consistent	The documentation is to be prepared in a uniform manner.

C — THE FAIR GUIDING PRINCIPLES FOR SCIENTIFIC DATA MANAGEMENT AND STEWARDSHIP

Title / Link	QR Code
<p>The FAIR Principles (seminal paper)</p> <p>Wilkinson M. <i>et al.</i> (2016). The FAIR Guiding Principles for scientific data management and stewardship. <i>Sci Data</i> 3, 160018. https://doi.org/10.1038/sdata.2016.18</p>	

The following list is copied from the article cited above, p.4. (own emphasis), and explains the criteria data and metadata should fulfill to be FAIR:

“To be **Findable**:

- F1. (meta)data are assigned a globally unique and **persistent identifier**
- F2. data are described with **rich metadata** (defined by R1 below)
- F3. metadata clearly and explicitly include the **identifier of the data they describe**
- F4. (meta)data are registered or indexed in a **searchable resource**

To be **Accessible**:

- A1. (meta)data are retrievable by their identifier using a **standardized communications protocol**
 - A1.1 the protocol is **open, free**, and universally **implementable**
 - A1.2 the protocol allows for an **authentication and authorization procedure**, where necessary
- A2. **metadata** are **accessible**, even when the **data** are **no longer available**

To be **Interoperable**:

- I1. (meta)data use a formal, accessible, shared, and broadly applicable **language** for knowledge representation.
- I2. (meta)data use **vocabularies** that follow **FAIR** principles
- I3. (meta)data include qualified **references** to other (meta)data

To be **Reusable**:




R1. meta(data) are richly **described** with a plurality of accurate and relevant attributes

R1.1. (meta)data are released with a clear and accessible data usage **license**


R1.2. (meta)data are associated with detailed **provenance**

R1.3. (meta)data meet domain-relevant community **standards**”

Further **information** on what the FAIR principles mean and how they can be implemented in scientific work can be found, for example, here:

Title / Link	QR Code
<p>GO-FAIR</p> <p>GO-FAIR. FAIR Principles. (Website). Last accessed: 2024-03-19. https://www.go-fair.org/fair-principles/</p>	
<p>FAIRsFAIR</p> <p>FAIRsFAIR – Fostering FAIR Data Practices in Europe. (Website). Last accessed: 2024-03-19. https://www.fairsfair.eu/</p>	
<p>How to FAIR</p> <p>Deutz et al. (2020). How to FAIR: a Danish website to guide researchers on making research data more FAIR. Repository: https://doi.org/10.5281/zenodo.3712065; Website: https://howtofair.dk</p>	

To **assess** in how far a data set conforms to the FAIR principles and where adjustments can be made, this tool can be recommended:

Title / Link	QR Code
<p>F-UJI Automated FAIR Data Assessment Tool</p> <p>(Website / Tool). Last accessed: 2024-03-19. https://www.f-uji.net/</p>	

D — CRITERIA FOR THE SELECTION OF PUBLICATION MEDIA

Last Update 2024-03

The FLI prefers and supports Open Access publications whenever possible (see also → [Appendix G: Payment Procedure](#)).

Before selecting a journal, the following **aspects should be considered**:

Content

- **What** do I want to publish? (New) results, methods, protocols, technical reports, review articles, repeat study?
- What **audience** or **subject** do I want to address?
 - Special topic vs. knowledge relevant to all researchers in a broad field?
 - Who should read my article?
- Which **journals** should be considered?
 - The **content** of the planned manuscript and the **scope** of the journal as well as the **importance** of the own contribution in comparison to already published ones have to match in order not to risk a rejection of the manuscript by the editor directly after submission (“**desk rejection**”).

Journal Visibility

- In which journals have my **colleagues published similar work**?
 - Review bibliographies of journals that I frequently consult myself to get more ideas for possible journals.
- How “**visible**” is the journal?
 - In which databases (PubMed, etc.) are the published papers listed?
- What prestige, what **reputation** does the journal enjoy?
 - The assessment should not be based solely on quantitative criteria, e.g., the impact factor.

Technicalities & Fees

- How **long** is the manuscript allowed to be?
 - Are there restrictions on the number of visual representations or references allowed?
- How complicated are **preparation and initial submission** of the manuscript?
 - Reasonable journals can have many dozen pages of guidelines (e.g., PLOS One). Plan and act accordingly.
- How and how quickly does **peer review** proceed?
 - Is it described on the website?
 - Trusted journals describe it transparently and completely.
- Does the journal allow a direct **transfer from preprint servers** to its submission portal?

- Does the journal allow for a “**presubmission inquiry**”?
 - If yes: study publication guidelines carefully and then decide whether to attempt a presubmission inquiry.
- If a desk/editorial rejection should occur – is there the possibility that a **transfer to another journal** at the same publisher can be carried out?
 - This might be suggested by the editor.
 - Discuss this option with all authors.
- What are the **fees** due for submission, for production, or after acceptance for publication?
 - Do longer manuscripts or more figures result in additional costs?
 - Are there waivers or discounts?

External Requirements

- Are there any restrictions or requirements on the part of the **doctoral regulations** or the institution?
- Are there any restrictions or requirements on the part of the **funding institution**?
 - Must the manuscript be published in an **open access** model? If yes: What are the options? **Diamond/gold/green/hybrid**²⁹, online first, **embargo** periods?
 - (How) must **raw data** etc. be made available?
 - Is there a permanent online archive?
 - Which **rights** to the published article are transferred to the publisher, which rights do the authors retain or acquire?




²⁹ Ghent University. (2024). (Re)Search Tips, Open Access colors: green, gold, diamond, hybrid and more. (Website). Last accessed: 2024-03-19. <https://onderzoektips.ugent.be/en/tips/00000461/>

E — AVOIDING PREDATORY PUBLISHING AND PREDATORY CONFERENCING

Last Update 2024-03

If little is known about a **journal**: use **Beall's List** and **Think.Check.Submit** (see below) to check whether it might be a predatory journal.

Before submitting a **conference** contribution or registering for a conference: check via **Think.Check.Attend** (see below) whether it could be a predatory conference.

Title / Link	QR Code
Beall's list Beall's list of potential predatory journals and publishers. (Website). Last accessed: 2024-03-19. https://beallslist.net	
Think.Check.Submit (Website). Last accessed: 2024-03-19. http://thinkchecksubmit.org	
Think.Check.Attend (Website). Last accessed: 2024-03-19. https://thinkcheckattend.org	

F — GUIDELINES FOR AVOIDING AUTHORSHIP DISPUTES

Last Update 2024-03

Title / Link	QR Code
<p>Albert T. and Wager E. (2003). How to handle authorship disputes: a guide for new researchers. <i>The COPE Report 2003</i>.</p> <p>(PDF). Last accessed: 2024-03-19. https://publicationethics.org/files/u2/2003pdf12.pdf</p>	

The following text is copied from the article cited above, pp.23f. (own emphasis).

“How to reduce the incidence of authorship problems

People generally **lie about authorship** in two ways:

- by putting down names of people who took little or no part in the research (**gift authorship**, see below)
- by leaving out names of people who did take part (**ghost authorship**, see below).

Preventing a problem is often better than solving it and we **recommend** the following **three principles**.

(a) Encourage a culture of ethical authorship

One problem is that people who are being unethical about authorship are simply following **local customs** and practice. They need to be made aware of the views of editors, so that in time the **culture will change**. As a junior researcher you can make sure your departmental library has at least one book on publication ethics (see list below). You can also inquire if there is a university or **departmental policy on authorship**, and suggest that you start working on one if there is not.




(b) Start discussing authorship when you plan your research

Raise the subject right at the start. Start gathering views of all team members and if possible **discuss authorship** at a face-to-face meeting. Even before a study is finished, you should have some idea of the publications that might come out of it, such as a conference abstract, the full paper, then some supplementary papers, and who is likely to be most involved in these. **Continue to discuss** ideas about authorship as the project evolves, and especially if new people get involved. Keep a written **record** of your decisions.

(c) Decide authorship before you start each article

Many authorship difficulties arise because of **misplaced expectations** and **poor communication**. So it is important that, before you start to write up your project, you **confirm in writing who will be doing what – and by when**. Ideally you should do this face to face, though this may not always be possible. Keep everyone **informed of any changes** with a written note.”

Additional reading:

Title / Link	QR Code
<p>CRedit (Contributor Roles Taxonomy)</p> <p>(Website). Last accessed: 2024-03-19. https://credit.niso.org/</p>	
<p>Harvard University Guidelines on Authorship and Acknowledgement</p> <p>(Website). Last accessed: 2024-03-19. https://research.fas.harvard.edu/links/guidelines-authorship-and-acknowledgement</p>	
<p>International Committee of Medical Journal Editors (ICMJE): Defining the Role of Authors and Contributors</p> <p>(Website). Last accessed: 2024-03-19. https://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html</p>	

G — RULES FOR PUBLISHING RESEARCH ARTICLES AT THE FLI

Last Update 2024-03

Prior to submission, please **inform** the **research coordination** team (koordinator@leibniz-fli.de) about any articles, books, book chapters, editorials, or other publication formats authored or co-authored by you.

Publications and other research outputs are recorded at the FLI using the CRIS (Current Research Information System) FACTscience³⁰.

These rules are in effect from January 1, 2018 onwards.

NOTE: This guide is meant to help you publish your research articles in line with FLI policies. For assistance or suggestions, contact research coordination (koordinator@leibniz-fli.de).

CONTENTS

- RESPONSIBILITIES
- AUTHORSHIP
- STATEMENTS REQUIRED IN ALL FLI PUBLICATIONS
- PUBLICATION PROCEDURE IN 9 STEPS
- PAYMENT PROCEDURE

RESPONSIBILITIES

These publication rules apply to all research articles (including submissions to pre-print repositories) authored or co-authored by one or more members of FLI. To help you identify who is responsible for notifying FLI’s research coordination and for adhering to the rules in cases with multiple FLI authors, please refer to the table below.

Case	Submission	Responsible Author
1	Publications with a corresponding author at the FLI	Corresponding author
2	Publications with data generated at the FLI with non-FLI corresponding authors	Leading FLI co-author

³⁰ Müller C. and Dämmrich J. (2018). FACTScience – ein flexibles System für Fortgeschrittene. Gemeinsamer Blog der DINI Arbeitsgruppen. Deutsche Initiative für Netzwerkinformation e. V. (DINI). (Website). Last accessed: 2024-03-19. https://blog.dini.de/EPub_FIS/2018/06/25/facts-science-ein-flexibles-system-fuer-fortgeschrittene/ (German only)

Please note that these responsibilities are complemented by the “**Rules for Archiving Publication-relevant Data**” (⇒ **Appendix H**) and the “**How-to for Archiving and External Assessment Before Submission (ABS) of Publications and Theses**” (⇒ **Appendix I**), found in the next two chapters. Please read all three chapters sufficiently early.

Furthermore involved:

- Research Coordination (koordinator@leibniz-fli.de)
- ABS officer
- CRIS administrator

AUTHORSHIP & AFFILIATION

Please **assign authorship according to GRP rules** (see FLI Guidelines of GRP ⇒ **Chapter 5.2**). If a contribution is not sufficient to justify authorship, the individual’s contribution may be properly stated in an acknowledgement (see text module below).

The FLI strongly encourages the use of **ORCIDs**³¹ for author identification.

Please assign **affiliations** according to GRP rules (see FLI Guidelines of GRP ⇒ **Chapter 5.2**). If possible, affiliations should be accompanied by the respective **ROR identifier**³².

STATEMENTS REQUIRED IN ALL FLI PUBLICATIONS

Please **implement the following statements** by copying (and if necessary, changing) the following text modules (brown background) to the appropriate manuscript sections.

Affiliation

WORKING GROUP, Leibniz Institute on Aging — Fritz Lipmann Institute (FLI) e.V., Jena, Germany, <https://ror.org/039a53269>.

Acknowledgements

If it applies:

The Core Facilities and Services (**SPECIFY CF/CS AND PEOPLE TO BE CONSIDERED**) of the FLI are gratefully acknowledged for their technological support.

The following is always **required** unless there is a separate funding statement (see below).

³¹ Open Researcher and Contributor ID (ORCID). (Website). Last accessed: 2024-03-19. <https://orcid.org/>

³² Research Organization Registry (ROR). (Website). Last accessed: 2024-03-19. <https://ror.org/>

The FLI is a member of the Leibniz Association and is financially supported by the Federal Government of Germany and the State of Thuringia.

Funding Statement

If a publisher does not offer a separate Funding Statement section in publications, the following statements should be made in the Acknowledgement section.

If **third-party funding** facilitated your research, please mention the funding source and **project ID** (example below for DFG, adapt as appropriate):

This study was supported by the German Research Foundation (project number(s)).

Additional funding for **open access costs** should be mentioned:

The publication of this article was funded by the Open Access Fund of the Leibniz Association and the Leibniz Institute on Aging – Fritz Lipmann Institute (FLI), Jena, Germany.

If not added automatically due to journal policies and if applicable:

Open Access funding was enabled and organized by Project DEAL.

If required and reasonable:

The FLI is a member of the Leibniz Association and is financially supported by the Federal Government of Germany and the State of Thuringia.

You can add:

The funding agencies did not influence the design of the study, the collection, analysis, and interpretation of data, nor the manuscript writing.

PUBLICATION PROCEDURE

Once you have clarified **authorship**, prepared all **publication-relevant data** (see **Rules** in ⇒ **Appendix H** and **How-To** in ⇒ **Appendix I**), completed your **manuscript**, and inserted the applicable **text modules**, the following steps need to/will be carried out.

IMPORTANT: Plan ahead and don't hesitate to reach out to research coordination (koordinator@leibniz-fli.de) if you need any help along the way.

Overview of the 9 Steps in the Publication Procedure

1. **Inform** research coordination before submission (by author)
2. Receive unique **identifier** (from research coordination)
3. Screening for **IP protection** potential (by external company)
4. Publication-relevant data **archive submission and screening** (by author, ABS officer)
5. Final **archiving** of publication-relevant data (by author)
6. Manuscript is **cleared** for publication (by ABS officer)
7. Inform research coordination about **acceptance** by the journal (by author)
 - Indicate announcement preferences (for Step 8)
 - Initiate Payment Procedure (see there)
8. **Announcement** of publication
 - Entry in FLI CRIS (by research coordination / CRIS administrator)
 - FLI websites (by research coordination)
 - Press release (by communication)
9. *[If necessary]* **Updating** the archive (by author)

Step 1: Inform Research Coordination about Planned Publication

The **responsible author informs research coordination** (koordinator@leibniz-fli.de) about a publication.

The information must be **accompanied** by:

- Electronic version of the **manuscript**
- Filled in **publication form**³³
- (Link to) Publication-relevant **data**
- Indication of whether you deem your results worthy of **IP protection** (see Step 3)

The publication form can be found in the intranet³³. The form requires that you **indicate** (if applicable) **third-party funding; licenses**, such as for animal experiments; and the **contributions** of Core Facilities and Services that have contributed to the publication.

NOTE: Publication-relevant data refers to all original and processed data that was used to draw conclusions presented in the manuscript or to prepare figures, tables, and other visualization therein.

The data must be **prepared**, i.e., labelled, described, and structured in a specific way to ensure both proper **archiving** according to FLI standards (⇒ **Step 5**) as well as the independent **scrutiny** (⇒ **Step 4**). **Instructions and examples** can be found in the next chapters, the “**Rules for Archiving**

³³ FLI-internal Publication Form. (2021). (PDF). Last accessed: 2024-03-19. http://www2.leibniz-fli.de/internals/Good%20Scientific%20Practice/2022-07-08_FLI_form_publication.pdf; (DOCX). Last accessed: 2024-03-19. http://www2.leibniz-fli.de/internals/Good%20Scientific%20Practice/2022-07-08_FLI_form_publication.docx

Publication-relevant Data” (⇒ **Appendix H**) and the **“How-to for Archiving and ABS of Publications and Theses”** (⇒ **Appendix I**).

Step 2: Receive a Unique Identifier

Research coordination will provide you with a manuscript number (**GWP-ID**), which serves as the unique identifier of the manuscript in the archiving and payment process.

This ID is **FLI-internal** and serves internal processing. It does not replace other globally/permanent identifiers like the DOI, for example.

NOTE: It is advisable to include the GWP-ID in your manuscript (e.g., under **“Data Availability”**) for future reference. However, this does not replace making your data available online, e.g., by publishing them in a **repository**.

Step 3: Screening for Intellectual Property Protection Potential

The manuscript of research articles with significant FLI input will be screened for **potential IP** (Intellectual Property) **protection**. Please indicate if you consider the results of the work **worthy of protection**. This helps to analyze the manuscript.

We work together with an independent knowledge and technology transfer company (**Ascenion GmbH**³⁴). They will do the clearance, while the process will be accompanied by the FLI **CF Technology Transfer**³⁵. In case of questions (also to decide whether this process should be initiated), research coordination is your first contact (koordination@leibniz-fli.de).

Step 4: Screening of Publication-Relevant Data (ABS)

NOTE: The checking of manuscripts before submission (a.k.a. Assessment Before Submission, **ABS**) is to be considered a **technical proofreading**, rather than a “distrustful investigation”. It is intended to safeguard the standards of GRP at the FLI and to prevent undesirable issues from arising after publication.

To facilitate screening (this step) and archiving (⇒ **Step 5**), you must compile a data package. Please refer to the ⇒ **Rules for Archiving and ABS (Appendix H): Archiving Procedure** for more information on where to store your data package. Additionally, please refer to the ⇒ **“How-To” (Appendix I)** for information on the required contents of the data package and best practices. A template is available there.

³⁴ Ascenion GmbH. Knowledge and Technology Transfer for Academic Life-Science Research. (Website). Last accessed: 2024-03-19. <https://www.ascenion.de/en/>

³⁵ FLI-Website: Core Facility Technology Transfer. Last accessed: 2024-03-19. <https://www.leibniz-fli.de/research/core-facilities-services/cf-technology-transfer-sparkfli>

The manuscript data is checked for completeness by the FLI ABS officer. The ABS officer decides on submission of select manuscript pieces to an external data specialist (e.g. RESIS³²). External analysis can include image checks and statistical evaluation; these are additionally checked for plagiarism.

The publications and data sets sent to an external company (**RESIS³⁶**) for checking remain **anonymous**. This means, any information regarding author/institution, etc. (which is irrelevant to the checking process) is not transmitted to the external company.

Checking of a paper takes some time (for theses please refer to the “**Rules for Thesis Submission**” ⇒ **Appendix K**), even if no inconsistencies are detected. Resolving inconsistencies might take extra day(s) and may require further input from the author(s).

NOTE: Saturday and Sunday are not **business days** at the external checking company and the company’s usual vacation periods usually are August and December 21st to January 3rd. Make sure to submit a publication for checking with enough time before the start of the vacation periods – and it is recommended to inform the ABS officer beforehand.

Manuscripts that have undergone **major revisions** – e.g. after the changing/addition of figures, new data, etc. – need to be **checked again before resubmitting** the manuscript to a journal.

The **ABS officer** will be **notified** by the company of their findings. If there are no objections, the responsible author(s) will be informed by the ABS officer and can proceed with ⇒ **Step 5**.

Should questions arise about data not generated at the FLI, the external co-authors have to be informed by the leading FLI author.

If any **inconsistencies** are found – which can be a result of copy paste errors or similar issues – the ABS officer will work closely with the responsible author(s) to examine and correct any errors. In the case that **scientific misconduct is suspected**, an ombudsperson will be called to action (see FLI Guidelines of GRP ⇒ **Chapter 5.3** and ⇒ **Chapter 9**). The ABS officer will decide whether another check is necessary.

The external check is implemented as a safety net to protect you and the FLI from accidental and intentional misconduct, respectively.

Step 5: Archiving of Publication-Relevant Data

Research coordination will deposit the publication-relevant data that you provided on the **FLI-internal data archive** (fliDA³⁷). This serves long-term data availability. It is encouraged that you also keep a **private copy** of your data (FLI Guidelines of GRP ⇒ **Chapter 4.7**). Additionally, it is

³⁶ RESIS Srl Research Integrity Solutions. (Website). Last accessed: 2024-03-19. <https://www.resis-srl.com/>

³⁷ FLI-internal portal to the FLI Data Archive (fliDA). Last accessed: 2024-03-19. <https://fliida.leibniz-fli.de/>

recommended that **you** deposit your data **in a repository** to allow global accessibility (after clearance; under embargo or after publication). For further information, contact the FLI Data Steward³⁸.

Step 6: Clearance for Publication

As soon as **archiving is completed** and (if applicable) **clearance** from both **Ascenion GmbH** (IP protection/patenting not impaired by publication) and **the ABS officer** (no manipulation found) is given, you will be informed by the ABS officer that you can **now submit** the manuscript to a journal of your choice (note also the ⇨ **Payment Procedure** below). Informing research coordination and finances early **helps timely publication**.

Step 7: Inform Research Coordination about Accepted Publication

You as responsible author give notice when the manuscript has been **accepted**., indicating the following:

- **Journal** and its impact factor
- Expected publication **date**
- Shall the publication appear on the group's **website**? (see ⇨ **Step 8**)
- Is the publication suitable for a **press release**? (see ⇨ **Step 8**)

Now is the **latest** point in the procedure to **initiate the Payment Procedure** as detailed below.

Step 8: Announcement of Publication

We add bibliographic and metadata details of your publications and research outputs for you to our CRIS system³⁹ for reporting. While research coordination regularly scans **PubMed**⁴⁰ for published works, any publication not listed there won't be directly entered into CRIS. This is often because the responsible person may not be aware of it. Please **inform the CRIS administrator** about all your published works to ensure their inclusion.

The FLI **publications website**⁴¹ and **research group websites** are updated weekly based on our CRIS. Thus, a publication reference will appear **automatically** there, as well as on the respective research group's website. If a group leader wishes to exclude a publication reference from showing on the website, they can indicate this on the publication form.

³⁸ FLI-Website: Data Steward. Last accessed: 2024-03-19. <https://www.leibniz-fli.de/research/good-scientific-practice/data-steward-at-fli>

³⁹ Current Research Information System (CRIS), at the FLI this is FactScience®

⁴⁰ National Library of Medicine (NLM). PubMed. (Website). Last accessed: 2024-03-19. <https://pubmed.ncbi.nlm.nih.gov/>

⁴¹ FLI Publications website: <https://www.leibniz-fli.de/research/publications>

We strongly encourage original articles with an FLI first or corresponding author to be communicated via a **press release** (outreach). This not only helps you and the institute in sharing your science with the public but also enhances the **visibility** of your work. Please contact FLI's communication department for help with the press release (kommunikation@leibniz-fli.de) as soon as your research is published.

Step 9: Updating the Archive

If anything changed in the publication-relevant data along the publication process, the FLI-internal archive needs to be updated. Please contact the ABS officer for this.

PAYMENT PROCEDURE

Different **kinds of costs** can be incurred when publishing papers. Some journals already charge a fee during the **application** process. Other journals charge costs for **printing**, for printing **color images**, or for **open access**.

At FLI, we strive to enhance the visibility of our institute's research by **covering the open access fees for publications in high-impact journals**. These expenses are fully covered by the institute, relieving research groups of concerns regarding high open access fees. It's important to note that this support only applies to open access publishing fees and does not cover any other costs. We encourage research groups to take advantage of this opportunity to maximize the reach of their work.

The impact factor (IF) or the five-year impact factor (5yIF) of the current edition of the Journal Citation Report is used, whichever is ≥ 7 .

Please note that if the impact factor is less than 7, the open access publication costs can be partially covered (20%) by the Publishing Fund of the Leibniz Association upon request (contact research coordination).

When a high-ranking publication comes from the FLI (first or corresponding authorship by FLI authors), then:

- **Open access fees** are paid by the **FLI** (please ask the team assistant of research coordination how to proceed).
- Other costs of the publication, as (partial) costs for publications with $IF < 7$, are paid by the **research groups** (group leaders are responsible for cost centers).

The following steps will need to be followed:

1. Register a BANF at SAP

If costs are expected, a payment order (**BANF**) has to be registered⁴² in the FLI SAP procurement portal⁴³ by an authorized user. This includes following steps (most of which are to be executed by the authorized SAP user):

- Initiate an office organization/public relations process
- Required information for input in “Positionsdaten”:
 - “Artikelbez.”: manuscript number (GWP-ID)
 - Impact factor of intended journal
 - Research group of responsible author(s)
- Choose in “Positionsdetail” – “Warengruppe”: “Veröffentlichung/Publikationen“.
- If there are additional fees (e.g., for color images or printing costs), according items can be added on the BANF.

Please consult with the team assistant of research coordination, if you are not sure at any point.

2. Procure invoice

The **manuscript number (GWP-ID)** must be **provided to the publishers** so that invoices can be allocated correctly. Please send the invoice to the Finance department: fibu@leibniz-fli.de.

3. Pay

The cost center (or the internal order) of the research group is used as the **account assignment object**. Approval is given according to the signature regulations.

In the event of publication in a journal with IF or 5yIF ≥ 7 , the **open access** version should ideally be chosen. These fees must be declared as such. Research coordination will confirm that the invoice is for publication in a journal with IF or 5yIF ≥ 7 and that open access costs are incurred. The budget of the research group will be increased by that amount by the controlling department. Another signature of the group leader is not necessary.

⁴² A BANF (SAP BestellANForderung/requisition note) is required for payment procedures. Lab managers are the first persons to ask for further information.

⁴³ FLI-internal SAP Portal. Last accessed: 2024-03-19. <https://portal.fli-net.fli-leibniz.de/irj/portal>

H — RULES FOR ARCHIVING AND EXTERNAL ASSESSMENT BEFORE SUBMISSION (ABS) OF PUBLICATION-RELEVANT DATA

Last Update 2024-03

These rules are to ensure **proper archiving of original data from publications** in compliance with the rules of good research practice (GRP) and are in effect from January 1, 2018 onwards.

Additionally, the prepared data will undergo **assessment before submission (ABS)**, i.e., be checked by an external company (RESIS⁴⁴) *before* submission of publications (see also ⇒ **Appendix G: Publication Procedure: Step 4**) or theses (see also ⇒ **Appendix K: The ABS Procedure**). As data archiving and the preparation of data files for checking go hand in hand, both aspects are covered here and in the “How-to” (⇒ **Appendix I**).

CONTENTS

- **RESPONSIBILITIES**
- **ARCHIVING PROCEDURE**
- **DATA PACKAGE CONTENTS AND STRUCTURE**
- **DEFINITION OF ORIGINAL DATA AND DATA TYPES**

RESPONSIBILITIES

Data sets to which these rules **apply** can belong to **one of three publication types / cases** (FLI corresponding author, FLI data, or thesis); depending on the case, **responsibilities** for adhering to the here described rules, i.e., documenting and archiving all (FLI-generated) data, differ as detailed in the **table below**.

Case	Submission	Responsible Person
1	Publications with a corresponding author at the FLI	Corresponding author
2	Publications with data generated at the FLI with non-FLI corresponding authors	Leading FLI co-author
3	PhD theses conducted at the FLI	PhD candidate

The rules described below apply to all three cases independent of who is responsible.

⁴⁴ RESIS Srl Research Integrity Solutions. (Website). Last accessed: 2024-03-19. <https://www.resis-srl.com/>

Furthermore involved in the described procedures:

- Research coordination (koordinator@leibniz-fli.de)
- ABS officer

ARCHIVING PROCEDURE

It is assumed that you already **informed research coordination** and received a **GWP-ID** (see ⇒ **Step 1** and ⇒ **Step 2** in the “**Rules for publishing**”, ⇒ **Appendix G**).

Next, you will electronically **compile the to-be-archived data package** (see below), including all publication-relevant original data, the resulting figures as found in the manuscript/thesis, according to the setup rules below (for details and **templates**, please consult the “**How-To**”, ⇒ **Appendix I!**).

There are three options, **where** you can compile the data package:

1. In your personal, local, or group disc space. This requires that you transfer the package to either option 1 or 2 yourself.
2. In a new folder in `:/newjersey/science/public/00_ABS/`.
3. In a new folder of the **FLI Data Archive** (fliDA⁴⁵). Please contact CF Life Science Computing (cflsc@leibniz-fli.de) to identify the appropriate location and get access rights. This option will become standard in the future.

If you chose **option 2** and finished the compilation, the read-only data package will be **transferred** to the non-public GWP-server. Please notify research coordination that you are ready. The transfer and archiving at **fliDA** will be carried out by the ABS officer.

If you chose **option 3** and finished the compilation, please notify the ABS officer.

In case of **updates**, please let the ABS officer know as soon as possible.

You will receive a **confirmation** of transfer and archiving when both processes are completed.

NOTE: Theses and publications with first or last authorships from the FLI **can only be submitted** for evaluation / to a journal when accompanying publication-relevant **files have been transferred to the FLI for electronic archiving**. Initial submissions are possible only **after** all steps as specified in the **Thesis Submission Checklist** (⇒ **Appendix J**) / **FLI-publication form**⁴⁶ have been fulfilled (see

⁴⁵ FLI-internal portal to the FLI Data Archive (fliDA). Last accessed: 2024-03-19. <https://fliida.leibniz-fli.de/>

⁴⁶ FLI-internal Publication Form (PDF). Last accessed: 2024-03-19. http://www2.leibniz-fli.de/internals/Good%20Scientific%20Practice/2022-07-08_FLI_form_publication.pdf

also ⇒ [Appendix K](#) and ⇒ [Appendix G](#)). The electronic archive must be updated after acceptance of the manuscript, including its CRIS entry.

Depositing in Repositories

When your data has been cleared (together with your manuscript; i.e., after external checks), you can **additionally** deposit the package in a **repository** of your choice. This makes sense, when the package does not include data already deposited in a specialized repository (e.g., GEO⁴⁷) but rather includes results of multiple methods. In this case, a generalist repository can be considered. Check the repositories requirements on previously (internally) archived data.

Publishing your data in a repository has the **benefit** of receiving a globally accessible unique permanent ID (e.g., a DOI⁴⁸). This can be handed to **reviewers** of your submitted journal article or be **cited** as a stand-alone data publication.

DATA PACKAGE CONTENTS AND STRUCTURE

Data in Bachelor's, Master's, and PhD theses and in publications should be presented in a clear and **transparent publication-quality** style (see “**Rules for Publishing**”, ⇒ [Appendix G](#)). Additionally, it is important to be able to back up all data shown and the conclusions drawn by **archiving the original data** accompanying a publication in a **complete** and **clearly organized** manner as findable, accessible, interoperable, and reusable (**FAIR**, see ⇒ [Appendix C](#)) as possible (see also ⇒ [Appendix A.3](#) for guides to create FAIR data).

The contents of this data package should be **structured in a standardized** manner as detailed in the “**How-To**”, ⇒ [Appendix I](#).

In short, it is expected that **for each figure** (graph, image, plot, table) that appears in the publication, there is an **individual folder** including the figure **file**, its **caption**, and all **data (originals** and replicates as well as procedural information of the analysis) supporting the figure (see ⇒ [Appendix I: Package Contents](#)). Additionally, you should include a “**dictionary**”-file whenever you include tabular (processed / result) data serving as a guide to the table (see ⇒ [Appendix I: Package Contents: Dictionary File](#)). The archive **parent folder** has to contain a **metadata** file.

A **template** is available, further explanations and details can be found in the “**How-To**” (⇒ [Appendix I](#)). Please feel free to contact the **FLI Data Steward for assistance**.

⁴⁷ NCBI Gene Expression Omnibus (GEO). Public functional genomics data repository. (Website). Last accessed: 2024-03-19. <https://www.ncbi.nlm.nih.gov/geo/>

⁴⁸ Information about Digital Object Identifiers (DOIs) at the DOI website. (Website). Last accessed: 2024-03-19. <https://www.doi.org/>

DEFINITION OF ORIGINAL DATA AND ITS DATA TYPES

Original data in this context refers to **digital** data.

Original data can be both raw data as yielded from machines and measurements, etc., as well as the modifications, summaries, etc., derived thereof and used for visualization in publications (i.e, figures, plots, graphs, tables, etc.). These two types (**raw and modified data**) must be kept **separate** and **identifiable** as such.

The following list of data sources and the respective types serves as a **reference** on which **file formats** are expected and recommended. However, this may be subject to change and does not assume completeness. Please **make sure to follow discipline-specific best practice** and **requirements** of repositories, etc. Please consider the ⇒ ["How-to": Best Practices File Formats](#) to prepare your data for **long-term** accessibility and interoperability.

In general, we strongly recommend aiming for the highest possible data FAIRness, i.e., data and metadata should be as **findable, accessible, interoperable, and reusable** as possible. Generally speaking, this requires descriptive **labelling, documentation**, and special care to **file formats** (see also ⇒ [Appendix I: File Names and Formats](#)). Please refer to the links (**guides and tools**) provided in ⇒ [Appendix A.3](#) and/or contact the FLI Data Steward for assistance.

All data needs to be accompanied by **documentation and metadata** (how, when, by whom, why was what data generated?). Please refer to the ⇒ ["How-to": Documentation of Research Data](#) for best practice recommendations.

Overview of the List of Data Sources / Types

- Animal Experiments
- FACS (Fluorescence Activated Cell Sorting)
- Gels
- HCS (High Content Screening) / Image Analysis
- Microscopy
- Nucleic Acid Sequencing
- Plate Reader, RT-PCR (Real-Time Polymerase Chain Reaction)
- Proteomics
- Software / Code
- Western Blots
- Data from Other Techniques not Mentioned Above

Animal Experiments

All **experimental records**, such as measurements, tables with weights, etc., need to be **stored and recorded** and are a **legal requirement** for animal protection authorities. For data shown in

publications or theses, for example brain slices, Western Blots, etc. the **identification number** (for example from Pyrat⁴⁹) of the respective animal must be indicated.

FACS (Fluorescence Activated Cell Sorting)

The original **.fcs** file plus an accompanying **.pdf** with the gate **settings**, etc. must be stored.

Gels

If parts of gels (Coomassie, silver, etc.) are shown, a **scan of the full-sized gel** needs to be stored. **Size standards** have to be clearly visible on that full-size image. **Preferable file formats** for long-term storage are: **.tiff**, **.png**.

HCS (High Content Screening) / Image Analysis

Data from automated microscopes

- All **image data** in its **native format** if this format is open source or a conversion tool is available; if not, then both the native and an **open-source format** such as uncompressed or lossless compressed TIFF or PNG format spanning the bit depth of the camera (e.g., 16bit). Alternatively, in the case of large files, a list of all references to the central/workgroup storage sites / archive site should be provided.
- The **image analysis pipeline** if exportable in connection to the image data.
- **Annotation files** in **.xlsx** and **.csv** format and result files in native format if this format is open source or also a conversion into **.xlsx** or **.csv**. Censoring or relabeling must be indicated.

Image analysis

- All **image raw data** and the image data in the analyzed format. Preferably open source format such as uncompressed or lossless compressed TIFF or PNG format.
- The image **analysis pipeline** in connection to the image data and an explanation of the analysis strategy
- **Annotation files** in **.xlsx** and **.csv** format
- **Result files** in native format if open source or **.csv** format.

Microscopy

Unmodified images as they were generated at the microscope, ideally in the **original format** (**.cvi** or others). **Uncompressed or lossless compressed** TIFF with preserved bit depth of the camera is also

⁴⁹ FLI-internal PyRAT (Python based Relational Animal Tracking) Database. Last accessed: 2024-03-19. <https://pyrat.leibniz-fli.de/pyrat/cgi-bin/login.py>

acceptable. Compression as occurring with JPEG (not lossless) is not advisable, unless files are extremely large.

Glass slides with coverslips are not considered original data – notably, immunofluorescence staining fades after a couple of weeks and therefore does not have to be stored.

Quantification data derived, for example, from intensities in regions of interest (ROI) must be clearly understandable with the help of an **example image**. If possible, ROIs, length measurements, etc. should be saved on the images and stored.

Nucleic Acid Sequencing

The following data should be stored and documented:

- **FASTQ** files as provided by the facility (if not stored by the Core Facility Sequencing; then, an indication towards the location of the files suffices)
- **Processed** file(s) in addition, e.g.:
 - **RNA-Seq**: normalized count table or table with RPKM values plus differential gene expression (DGE) list as .txt, .csv, or .xlsx
 - **ChIP-Seq**: a file that allows inspection of the experiment in a genome browser, e.g., .bedgraph or .bigwig format
 - the same applies for **other** sequencing applications, e.g., WGBS, 4C-Seq, MeDIP, 4-sU-Seq, etc.
- **Documentation** of
 - the **reference genome** (e.g., mm10) and
 - **bioinformatics tools** (including the exact versions and parameters) that were used to get from primary data (FASTQ) to processed data (if available, a .txt file containing the whole analysis pipeline should be provided).

Also consider **guidelines** of standard repositories, e.g.:

- NCBI GEO: <https://www.ncbi.nlm.nih.gov/geo/info/seq.html>
- ENA (Checklists based on sample): <https://www.ebi.ac.uk/ena/browser/checklists>

Plate Reader, RT-PCR (Real-Time Polymerase Chain Reaction)

- **Original data** from plate reader, RT-PCR, etc. need to be stored, ideally in a common format such as .csv or .xml.
- Additionally, the **protocol to process** the data and the **tabular** data containing the **results** must be stored (in .csv or .xlsx format), with **reference to the respective lab book entries**.

- Other files (for example for checking a requested plasmid) do not need to be archived in a publication data folder, but need to be traceable via, for example, a plasmid map that has a reference to a lab book entry.

Proteomics

For proteomics data requirements are be **based on guidelines**:

- for submission of proteomics data to one of the standard repositories, **PRIDE**: <http://www.ebi.ac.uk/pride/help/archive/submission>
- for reporting of proteomics data to a major specialized proteomics journal, MCP: <https://www.mcponline.org/guidelines>

Current requirements for files/file types include the following:

- **Raw files**: the mass spectrometry (MS) instrument output files
- **Search engine result files**: the original output from your search engine or your analysis pipeline
- **Peak list files**: peak list files (e.g., mgf files prepared for a Mascot search) that were used for the original search
- **Quantification result files**: quantification-related files reporting on peptide/protein quantitative values/ratios should be provided (e.g., PSM TMT intensity value exported from Proteome Discoverer, LFQ/iBAQ values exported from MaxQuant, Log2FC ratios provided from Spectronaut)
- **Sequence database files**: the sequence database file (usually in FASTA format) that was used to perform the mass spectral search
- **Spectrum libraries**: the spectral library file that was used for performing the mass spectrometry search if DIA data was used for the quantitative label free analysis in Spectronaut (also a description of how this library was made)
- **Gel image files**: if gel electrophoresis has been used as a separation method for proteins the gel image files have to be provided
- **Post-processing files**: everything else that did not fit into the categories above – for instance protein inference files generated by post-processing of the search engine results or R scripts used for differential expression.

Software / Code

Code files in the format according to programming language can be also original data.

Supplemental information should be stored together with the code:

- **Descriptive** information as document in .txt, .md, similar text-based format, or .pdf format
 - Name of the code/program/algorithm/software

- Short description of function / purpose
- Version of the software
- Publication date (YYYY-MM-DD), link to publication / repository
- Name of creator and of rights holder (FLI)
- Contact information of creator and FLI
- License
- For more complex code / software additionally recommended information to be added
 - Code structure (classes, functions/sub-routines, variables, etc.)
 - Used algorithms
 - Dependencies
 - Use cases and tests
- **Documentation** as document in .txt, .md, similar text-based format, or .pdf format

Western Blots

- Full-size **scans from original films** and data **files** from the luminescence **imager** need to be stored.
- If possible, regions of interest (**ROI**) for quantifications should be **saved**, to make quantifications understandable.
- The table containing the **quantified numbers**, SD/SEM, etc. must be stored.
- **Scans of blots** must be labeled and accompanied by a file **describing** the details.

Data from Other Techniques not Mentioned Above

Follow the same scheme as above and store:

- **Original data** coming from instruments/analyses as **raw** data
- **Documentation** of how raw data was generated and how it was processed (⇒ "**How-to**": **Documentation of Research Data**)
- If the **format is proprietary**, add a **copy** in an open and free standard format
- Data used for visualization, i.e., modifications or summaries of the raw data
- **Procedure** of how the data were analyzed and/or validated

I — “HOW-TO” FOR ARCHIVING AND EXTERNAL ASSESSMENT BEFORE SUBMISSION (ABS) OF PUBLICATIONS AND THESES

Last Update 2024-03

IMPORTANT NOTES:

- Please **submit** manuscripts/theses for archiving and ABS only in their **final form**.
- **Complex** documents and the organization of their data can, of course, be **discussed in advance** (contact the ABS officer and or the data steward).
- Checking of manuscripts and theses must **include “supplementary information / material”** as well.
- Incomplete data packages will NOT be processed.

The following chapter explains in detail how you compile a data package that is **ready** to be **archived** in fliDA⁵⁰, to be sent out (after selection of relevant parts and anonymization) for **external checking**, and ready for you to **publish** where you wish (after clearance by the external checking company). The goal is to produce data that is as **FAIR**⁵¹ and **understandable** as possible.

Please do not hesitate to contact the FLI data steward and/or ABS officer whenever you have questions or concerns in the process of preparing your data. **We are happy to support you!**

The requirements are summarized in a **checklist** (⇒ **Appendix J**) for your convenience. Please consider it carefully.

CONTENTS

- **FILE NAMES AND FORMATS**
 - Best Practices File Names
 - Best Practices File Formats
- **DOCUMENTATION OF RESEARCH DATA**
- **PACKAGE CONTENTS AND STRUCTURE**
 - Template Availability
 - Overview of Files and Folder Structure
 - Archive Metadata File
- External Data File
- Figure Metadata File
- Manuscript Files
- Figure and Caption Files
- Original Data Files
- Replicate Data Files
- Dictionary Files
- Analysis Folder
- **SPECIFICS OF THESIS PACKAGES**

⁵⁰ FLI-internal portal to the FLI Data Archive (fliDA). Last accessed: 2024-03-19. <https://fliida.leibniz-fli.de/>

⁵¹ FAIR Principles: F – findable, A – accessible, I – interoperable, R – reusable. Introduced by Mark Wilkinson *et al.* (2016) The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* **3**, 160018. <https://doi.org/10.1038/sdata.2016.18>

FILE NAMES AND FORMATS

It is strongly advised that you use **file naming schemes**. This means, you should decide what scheme(s) you want to use for which group of files, to document it, and to use it. Ideally, this is planned before project start to save you subsequent renaming efforts. Please refer to the [⇒ Best Practices File Names](#) below and the accompanying links therein.

All files / folders / subfolders have to be organized and named in a self-explanatory way (e.g., by figure and panel number, “Fig3F_...”), to allow immediate **and intuitive tracing and finding** in the event that a particular panel of a figure has to be traced back to the raw/original data. Please refer to the [⇒ Package Contents: Overview of Folder Structure](#) for further information on how to structure your data according to the “**Rules for Archiving and ABS**” ([⇒ Appendix H](#)).

Research data needs to be published and made available in the long-term. For this, it is crucial to consider in which file format data is stored. Proprietary software, for examples, bears the risk of being discontinued and then not compatible with other software, leading to data loss. To make your data as suitable for long-term archiving as possible, please refer to the [⇒ Best Practices File Formats](#) below.

Best Practices File Names



File names should be:

- Human- and machine-readable
- Content-specific and descriptive
- Playing well with default ordering (alphabetical, chronological)
- Consistent (at least within a specific group of files)
- Documented and shared among collaborators
- As short as possible – abbreviations and codes have to be explained ideally in a document alongside the group of files

File names should consist of:

- **Alphanumerical** characters, dashes (“-”), and underscores (“_”) only
 - **AVOID:** Special characters like { } [] < > () * % # ‘ ; “ , : ? ! & @ \$ % = ~ . ä ö ü ß
 - **AVOID:** Spaces / blanks
 - Special characters and spaces may interfere with automated processing and when switching operating systems (consider collaboration and reuse)!
- Deliberately **separated** metadata elements
 - “Kebab-case”: Elements are separated by dashes. Often used within one element
 - “Snake_case”: Elements are separated by underscores
 - “CamelCase”: Elements are separated by capitalization
- If **dates** are used, only use the ISO 8601 Standard, i.e., YYYYMMDD or YYYY-MM-DD

- **Max. 255 characters** including folder names (Windows maximum path length, longer names might result in unexpected errors, like deletion)
- If **numbers** are used, they should be **left-padded**, i.e., preceded by zeros according to the (approximate) total of required numbers. This means, when you have up to 999 files, numbering should start with 001; in case of up to 9999 files, numbering should start with 0001.

Title / Link	QR Code
<p>File Naming Conventions by the Harvard University</p> <p>Harvard Longwood Medical Area Research Data Management Working Group. Data Management Plans. (Website). Last accessed: 2024-03-19. https://datamanagement.hms.harvard.edu/plan-design/file-naming-conventions</p>	
<p>Worksheet to Design a File Naming Scheme</p> <p>Briney KA. (2020). File Naming Convention Worksheet. https://doi.org/10.7907/894q-zr22.</p>	

Best Practices File Formats

Ideally, you work with **open, free-to-use** software to generate and process data. Alternatively, consider depositing a software clone with the data. If this is not possible, check whether **converting** to an open format is possible. Feel free to contact the CF Life Science Computing (cflsc@leibniz-fli.de) for advice / technical support.

For example, tabular data files can be archived in **.xlsx** format, and it is strongly recommended to have a copy (via export) alongside it in a text-based format, like **.csv** or **.tsv**, to ensure long-term interoperability. Consider familiarizing yourself with and adhering to **tidy data principles** (find link below).

If you submit **tabular data** in **.xlsx** format, it is strongly recommended – for the sake of long-term accessibility and compatibility – to have an individual file for each sheet, i.e., avoid having multiple sheet tabs in your file. For the same reason it is not endorsed to have figures within an **.xlsx** file. Thus, if you used Excel to generate your **graph**, export it as individual file⁵² (e.g., as **.png** with a resolution of 300 dpi) and delete it from the to-be-archived file. We strongly encourage you to **use R** for data

⁵² TrumpExcel. (2020). Best Excel Tutorials: How to export individual .pngs form Excel. (Website). Last accessed: 2024-03-19.
<https://trumpexcel.com/save-excel-charts-as-images/>


analysis and plotting including documentation of the process; please contact the CF Life Science Computing (cflsc@leibniz-fli.de) for advice and support.

Consider saving your PDF-files in PDF/A format. This is an official archiving version of the PDF format as defined by the ISO 19005-1:2005 standard.

It is recommended to save image data in TIFF 6.0 uncompressed (.tif) format for best long-term archiving properties, but other formats are also acceptable: TIFF other versions (.tif, .tiff), RAW image format (.raw), Photoshop files (.psd), BMP (.bmp), PNG (.png), Adobe Portable Document Format (PDF/A, PDF) (.pdf).

Generally, formats are considered **suitable** for research data and long-term archiving, when they are **compatible** (interoperable) with many (open, free, standard) software tools, allow a **loss-less** conversion to alternative formats, provide **metadata** content, can be expected to be **stable** over a long time, and **readable** for machines and humans. Further information can be found here:

Title / Link	QR Code
<p>Tidy data principles in 10 steps (Paper)</p> <p>Broman KW. and Woo KH. (2018). Data Organization in Spreadsheets. <i>The American Statistician</i>, 72(1), 2–10. https://doi.org/10.1080/00031305.2017.1375989</p>	
<p>Data formats for Preservation (Section “How to deal with this”) by OpenAIRE</p> <p>(Website). Last accessed: 2024-03-19. https://www.openaire.eu/data-formats-preservation-guide</p>	
<p>File Formats and Data Conversion by the CESSDA RDM Expert Guide</p> <p>CESSDA Training Team (2017 - 2022). CESSDA Data Management Expert Guide. Bergen, Norway: CESSDA ERIC. (Website). Last accessed: 2024-03-19. https://dmeg.cessda.eu/Data-Management-Expert-Guide/3.-Process/File-formats-and-data-conversion</p>	

Title / Link	QR Code
<p>Slide Deck on File Formats (FLI RDM Intro Series⁵³)</p> <p>(PDF). Last accessed: 2024-03-19. https://zenodo.org/record/7573695/files/2-1_Espresso_Formats.pdf?download=1</p>	

DOCUMENTATION OF RESEARCH DATA


Data needs documentation and **metadata** to be of any value, i.e., **understandable, replicable, and reusable**.

Documentation occurs on **multiple levels**: project-level information (overview of aims, hypotheses, methodologies, data management measures, involved persons); methods-level (protocols, SOPs, software, versions, parameters); data-level (context, processing steps, relations, contents, abbreviations).


For each of these levels there are multiple **options to record** the information, the most obvious being embedded metadata (e.g., in image files); ELN-entries; README files; a data management plan (DMP). Which way(s) of documentation suit the data at hand best depends on data type and context.

Independently of how documentation and metadata are recorded, the information needs to be **provided together with the data** and be as FAIR as possible.

Please refer to the following links for more information and get in touch with the data steward and/or the CF Life Science Computing (cflsc@leibniz-fli.de) for support.

Title / Link	QR Code
<p>Documentation and Metadata (General information and explanation video) by the CESSDA RDM Expert Guide</p> <p>CESSDA Training Team (2017 - 2022). CESSDA Data Management Expert Guide. Bergen, Norway: CESSDA ERIC. (Website). Last accessed: 2024-03-19. https://dmeg.cessda.eu/Data-Management-Expert-Guide/2.-Organise-Document/Documentation-and-metadata</p>	

⁵³ Wilbrandt J. (2023). Research Data Management Intro Series: Coffee Lectures & Espresso Shots. Zenodo. <https://doi.org/10.5281/zenodo.7573694>

Title / Link	QR Code
<p>Documentation and Metadata. General information and tools by RDMkit</p> <p>ELIXIR (2021) Research Data Management Kit. A deliverable from the EU-funded ELIXIR-CONVERGE project (grant agreement 871075). Documentation and Metadata. (Website). Last accessed: 2024-03-19. https://rdmkit.elixir-europe.org/metadata_management</p>	

The following instructions on how to compile your data package contain templates for your convenience, e.g., a project-level metadata file (download see ⇒ **Template**).

PACKAGE CONTENTS

The data package shall contain **all FLI-generated data** that were **used to draw conclusions** or were otherwise incorporated in a publication or thesis. This includes all **supplementary data** as well; thus, all images/files used for quantification, including **replicates**, must be stored. The package serves as internal **backup** for published data and has to be **self-explaining** to ensure **replicability** and **reusability**. Additionally, the package will be the basis for the **ABS** (see ⇒ **Appendix G: Publication Procedure: Step 4**).

To **understand** the data package without further help of the provider (you), the **standardized content and structure** is required as described in the following.

The here introduced content and structural requirements follow **best practice** recommendations of RDM and comply with general requirements of **repositories**⁵⁴. Thus, it is possible for you to directly **publish** the package as is in a repository and achieve global accessibility (after an embargo, if desired). Adhering to this standard is also **beneficial** in easing the **peer review** process that includes an assessment of the data.


For shortness, we refer in the following to any visualization / presentation of data in the manuscript as **figure** and thus **exemplified** the folders and files named as such. However, the given principles apply to **any data presentation**.

⁵⁴ Data set requirements and best practices by repositories, for example Dryad, open data publishing platform. (2024). Best Practices. (Website). Last accessed: 2024-03-19. https://datadryad.org/stash/best_practices

Template Availability

The **folder structure** (in ZIP format) and specific **files** (in in XLSX, ZIP, and TXT format) described in the following are available as **templates** from the research coordination cloud folder.

In most template files, you will find an **example line** to help you fill in your information. Please delete this line in your files!

Title / Link	QR Code
<p>FLI-internal ABS Data Package Folder Template</p> <p>(Direct download of ZIP). Last accessed: 2024-03-19. https://cloud.leibniz-fli.de/index.php/s/gPgzF2pMYdX9onC/download</p>	

Overview of Files and Folder Structure

Here, you find a short overview on the required structure and content. The following sections will describe in more detail what is expected for each folder and special file.

- Archive Metadata File
- External Data File
- Figure Metadata File
- Manuscript Files
- Figure and Caption Files
- Original Data Files
- Replicate Data Files
- Dictionary Files
- Analysis Folder

The ⇔ **Overview Figure** below visualizes the intended content and structure, with the content of representative subfolders as examples.

The package’s **parent folder** will hold the **metadata** file and folders for the manuscript and for each figure that used data.

Within each figure folder, there have to be at least three folders: for original data, for replicate data if applicable, and for the analysis. Furthermore, the figure folder needs to contain the figure itself, its caption (“Cap” in the figure below), and its README. In the original data folder, original data of tabular form has to be accompanied by a dictionary file.

A **template** of the folder structure including the archive metadata, figure metadata, dictionary, and ExternalData files (explained in the following) is available here: ⇨ **Template**. Please feel free to contact the **FLI data steward** for further **guidance and assistance**.

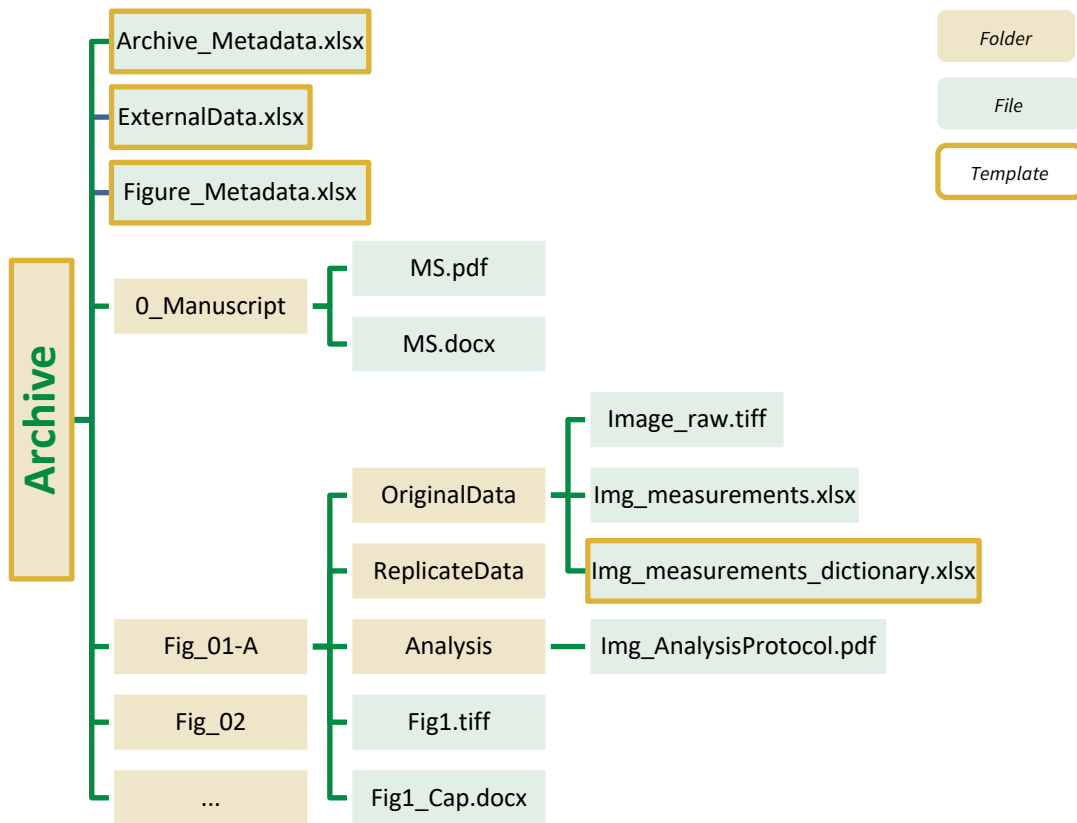


Figure 1: Overview of Files and Folder Structure for Data Packages

Archive Metadata File (Template available)

The metadata file accompanies all to-be-archived data packages of theses/publications.

This file will be incorporated as the metadata information within **fiDA** during the archiving process. It is **required** to find and access your data package.

The called-for metadata elements follow the general **metadata standard of DataCite⁵⁵** and are usually **required** for any other **publication by journals and repositories** as well.

⁵⁵ DataCite Metadata Working Group. (2021). DataCite Metadata Schema Documentation for the Publication and Citation of Research Data and Other Research Outputs. Version 4.4. <https://doi.org/10.14454/3w3z-sa82>; see Tab 1 and 2 in the Documentation. (PDF). Last accessed: 2024-03-19. https://schema.datacite.org/meta/kernel-4.4/doc/DataCite-MetadataKernel_v4.4.pdf

This file contains **information** about the project from which the data/publication results, including the following elements:

Metadata Element	Explanation
Title	The title of your data package
Abstract	The publication’s abstract or the thesis summary
GWP-ID	ID of the FLI GWP process, scheme: YYYY-000-00 (e.g.: 2021-003 or 2017-023-01)
Version	A version number for the data package; first submission will be version 1. In case of updates, this will rise.
Research Group(s)	Which FLI Research Group(s) is involved in the project / publication?
Author	Who authored the publication / thesis?
Archive submitted by	Who is submitting this data package?
Published	If the publication is already published, publication year and permanent ID (e.g., DOI) have to be given.
Data classification	How is your data classified with regards to information security policy (public, basic, sensitive, critical)?
Data package access	Once archived, how is your data package accessible to third parties (open, restricted, closed)?
Retention period	The minimum amount of years this data package will remain in fliDA. Standard is 10 years after publication/public accessibility/qualification date, deviations have to be explained. Some data have to be stored for much longer.
License	The license under which you offer the data package for use by third parties. Preferred value is CC 4.0 BY ⁵⁶
Language of the data	The language of the data package

⁵⁶ Creative Commons. About Licenses. (Website). Last accessed: 2024-03-19. <https://creativecommons.org/about/ccllicenses/>

Metadata Element	Explanation
Tags	Add (searchable) key words to your data package.
Related data package	If there is a data package in fliDA that was (partly) used for this publication, it should be referred to here.
Funding reference	Give here the name(s) of the organization(s) funding the research and award or grant number issued by the funding organization.

Metadata File – Elements and Explanations

External Data File (Template available)

If original (raw) data files are **too large or already archived somewhere else**, you have to document the respective location.

Ideally, you provide an .xlsx file titled “**ExternalData**” in your data package. This shall give information on the data set name, how it was used, which files in your archive are related to it (e.g., a processed version), and how it can be accessed (link, access conditions). A **template** for this file is also included in the → [Template](#).

For large data sets from **core facilities** (e.g., CF Sequencing, CF Proteomics/MS data) the storage location of the data sets (**path to data**) should be specified. In these – and only these – cases, the data sets do not need to be delivered in duplicate with the other data to the archive. However, the author is responsible for gathering and sharing the information on storage locations of these large data sets.

If the external dataset is **already archived in fliDA**, it suffices to refer to it by **ID** in the metadata file. For data sets **on publicly available servers**, only the **link** to the files/data on that server need to be provided.

Additionally, this file shall hold the information of which **figures** were **NOT generated at the FLI**.

Figure Metadata File (Template available)

In previous versions of the “How-to”, this was called “OriginalDataOverview.xlsx”.

The figure metadata file must provide information about **who/when/where** for all figures:

- **Who** produced the figure (plot, graph, image, table, etc.)?
- **Who** performed the experiment(s) or otherwise collected the underlying data?
- **When** was the data collected (both original and replicate)?
- **Where** are the specific files that were used to create the figure? (Should be within the data package and specify the name of the file)

Manuscript Files

The manuscript text is needed in **both .pdf format and .docx format** (or a similar, compatible word processor format). The manuscript may contain embedded figures, tables, graphs, etc., i.e., be formatted like an edited publication.

NOTE: The word processor file is important to allow complete **anonymization** prior to submission to the external check.

Figure and Caption Files

Figure Files

Image panels (as shown in the manuscript) shall be given as **individual files** accompanied by a **larger** version if the size of the figure embedded in manuscript/thesis is small. Ideally, image files are given with **pixel-based formats** like .tiff or .png with sufficient resolution (recommended for print is a minimum of **300 dpi**); .pdf is possible.

AVOID: The jpeg format is **not** suitable, it is prone to compression artifacts. Also, images embedded in PowerPoint or other documents are not acceptable.

The **larger version** is important, because below a certain size or resolution, image checking (by RESIS) is not reliable, and we will be asked to provide the larger version. Should questions arise about figures compiled from data *not* generated at the FLI, the external co-authors will be informed by the leading FLI author.

Original microscopic images or other original image files (uncropped blots, gels, etc.) are to be included in the **original data folder** using the proprietary format (e.g., .czi). Additionally, proprietary format images should be accompanied by a copy in .tiff or .png format in high-resolution (see also ⇒ **Appendix H: Definitions**); if this is not possible, provide at least a large(!) .pdf file.

AVOID: Original image files are not accepted in .jpeg or the Windows-specific .emf format.

Where applicable, **extracted parts** of images/blots/etc. should be clearly indicated on the full-size originals.

Plots (previously referred to as graph data) should be handled like images: provide an individual file with the plot and the tabular data in the original data folder, according to file format best practices (see ⇒ **Best Practices File Formats**). How the tabular data in the original data folder is to be handled can be found in the following section.


Table data (if e.g., data shown in a table are calculated from original sets) shall be provided as spreadsheet in .xlsx, .csv, or .tsv format. Again, the underlying original (tabular) data has to be provided in the respective folder.

Caption Files

Every figure shall be accompanied by a caption, ideally in a separate document file with a clearly identifying name, e.g., “Fig1a_Caption”. Acceptable formats are .docx, .rtf, .txt, .md, .pdf/a.

The caption must contain information including but not limited to the **number of independent experiments, number of analyzed samples** (e.g., cells/organelles/mice); **genetic background, age, genotype**, used **statistical test** and its results, etc. It is advisable to include a breakdown of the **abbreviations** used in the figure and its caption, and information on the used **units**.

Further reading on figures and captions, including example captions:

Title / Link	QR Code
<p>How to design effective figures for scientific articles (Slides)</p> <p>Researcher Academy Mendeley group, Elsevier. (2020). How to design effective figures for scientific articles. (PDF). Last accessed: 2024-03-19. https://researcheracademy.elsevier.com/uploads/2020-10/ELS_webinar%20slides%20figure%20design.pdf</p>	
<p>Five Common Pitfalls to Avoid while Composing Scientific Figures (Paper)</p> <p>Biegel CM. and Kamat PV. (2021). Five Common Pitfalls to Avoid while Composing Scientific Figures. <i>ACS Energy Lett.</i> 6, 12, 4309–4310. https://doi.org/10.1021/acsenergylett.1c02401</p>	
<p>Composing Effective Figure Captions in Scientific Articles and Posters.</p> <p>Hixon Writing Center. (2021). Composing Effective Figure Captions in Scientific Articles and Posters. (PDF). Last accessed: 2024-03-19. https://writing.caltech.edu/documents/27629/HWC-FigureCaptionHandout.1-2024.pdf</p>	

In cases where a journal has divergent regulations (e.g., word limit in captions), the information then cropped from the caption should be given in the manuscript’s material and methods section or in a supplementary information section.

Original Data Files

Original data files comprise **both raw and processed/modified files** (see ⇨ **Appendix H: Definitions**). Thus, both types must be provided in the original data folder. Provide a separate data file for every individual figure (bar graph, curve, pie graph, etc.).

Remember that **raw** data are ideally kept as **read-only** file directly from its generation onwards. The raw versions all data shown (i.e., all original images, full-size Western blots (labeled), FACS data, etc.)

have to be included. In case that the raw data are too large/already archived, please see section [⇒ External Data File](#).

Providing the raw data files of *FLI-generated* data that were used for image-containing figures (both figures and supplementary figures) enables rapid action if checking produces questions regarding the integrity of a figure (which e.g., might simply be due to compression artifacts in the pdf procedure).

Processed files are the results of annotation, summarizing, aggregation, conversion, excerpting, and similar modifications. This includes **tables** with quantification data to calculate graphs with means, SD/SEM, etc. In most cases, processed files will be the basis of your figures. Make sure to save them alongside with your figure when you generate it, so that you can provide them here easily.

The **data file** that is the **basis of a figure** should, if applicable, contain the X and Y plotting data. If additional, complementing values or statistical information (such as, for example: n, standard deviation, mean, median, statistical test, p value, multiple testing correction method, adjusted p value) shall be provided, do so in an additional spreadsheet file, which is named accordingly.

Example content of an OriginalData folder:

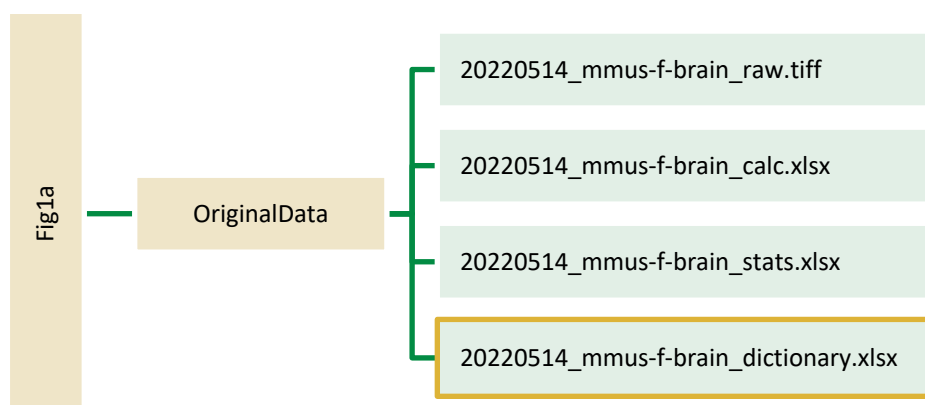


Figure 2: Example content of an OriginalData folder. Full Structure in [Fig. 1](#)

Tables/spreadsheets must contain (either in the file name or the file itself) the dates or other unequivocal identifiers of the experiments used for quantification as well as some title/explanation/reference indicating to which experiment they belong. With the indicated dates, the experimental details must be traceable in the FLI ELN or lab book.

If further information is necessary to understand the genesis, relationships, or particulars of any file provided here, add a **README**.

Replicate Data Files

Data of replicate experiments must also be included. The **same rules** apply as for the **original** data files.

The replication data folder can be **omitted if** it is **not applicable** or when the replicate data was incorporated in the figure. In the latter case, the data must be included in the original data folder and the relationship between the files must become clear from either the file names or an additional README file.

Dictionary Files (Template available)

“A data dictionary is a file (or collection of files) which unambiguously **declares, defines and annotates all the variables collected** in a project and associated to a dataset.”⁵⁷ This explanation of variables, usually declared in column headers, helps tremendously in understanding and reusing data.

A data dictionary is itself presented in **tabular format**. By using a standard **template**, you ensure that this file does not require further explanation; rather you can refer to the standard (in this case, this guideline⁵⁸).

For each tabular data file with **unique content**, a dictionary file should be provided. Alternatively, you can create one dictionary for multiple tabular files, where you add a first column which specifies the file in which the described variable occurs.

When archiving at the FLI, the standard dictionary (as provided with the ⇨ **Template**) expects that you create one dictionary per tabular data file. This approach makes it easier for you to share individual files together with their annotation if desired. Each dictionary holds the **following elements** (where “Element Name” is the human readable long form, and “Element” the form in which the column is labelled in the template):

⁵⁷ The FAIR CookBook. Interoperability. Creating a Data/Variable Dictionary. (Website). Last accessed: 2024-03-19.
<https://faircookbook.elixir-europe.org/content/recipes/interoperability/creating-data-dictionary.html>

⁵⁸ Example citation: Data dictionary based on template from Briest W. et al. (2023). Guidelines of Good Research Practice at the Leibniz Institute on Aging – Fritz Lipmann Institute (3.0). Appendix J. Zenodo. <https://zenodo.org/doi/10.5281/zenodo.8276433>

Element Name	Element	Explanation
Variable	var	Name of the variable (field / column header), usually an abbreviation.
Variable Description	var_descr	A self-explanatory description of the variable name, including the expansion of the abbreviation.
Variable Data Type	var_dat_type	The data type of the variable, usually either “date”, “integer” (a whole number), “float” (a number with decimals), “char” (a single character), or “string” (a combination of alphanumeric characters).
Unit	unit	The unit in which the values are measured; ideally an SI-unit.
Max Allowed Value	max_val	Upper limit of the allowed values if the variable is quantitative.
Min Allowed Value	min_val	Lower limit of the allowed values if the variable is quantitative.
Allowed Value Shorthands	allow_val	Free-text list of allowed values (e.g., “M, F” for sex) if the variable is categorical.
Allowed Value Description	allow_val_descr	Free-text list of annotations of the allowed values (e.g., “M=male, F=female” for sex) if the variable is categorical.
Computed Value	compu_val	If a field is computed based on values from other fields, annotate the calculation rule (e.g., BMI= WEIGHT/(HEIGHT*HEIGHT)).
Missing Value Indicator	miss_val	Fields of the table can be empty, either because a value was not collected or it never existed. To distinguish intentionally missing values from erroneous ones, specify how missing values are indicated. “NA” is recommended.
Comment	comm	Free-text field for any further information.

Data Dictionary – Elements and Explanations

Example Tabular Data and Dictionary

Dataset with columns:

ID	s_len	p_len	spec
1	5.1	1.4	setosa
2	6.5	2.4	versicolor
3	6.3	6.0	virginica



Information on the columns:

Var	Var_descr	Var_dat_type	Unit	Max_val	Min_val	Allow_val	Allow_val_descr	Compu_val	Miss_Val	Comm
ID	Identifier	int	NA	999	1	NA	NA	NA	Not allowed	The identifier of the measurement/observation.
s_len	sepal length	float	cm	50	1	NA	NA	NA	„NA“	Measuring a single sepal of a single <i>Iris</i> flower, what is its length?
p_len	petal length	float	cm	50	1	NA	NA	NA	„NA“	Measuring a single petal of a single <i>Iris</i> flower, what is its length?
spec	species	text	NA	NA	NA	„setosa“, „versicolor“, „virginica“	NA	NA	„NA“	The name of one of the three measured species of the genus <i>Iris</i> (L., Iridaceae, Asparagales).



Dr. Jeanne Wilbrandt — Data Steward — jeanne.wilbrandt@leibniz-fli.de

Figure 3: Example Tabular Data and Corresponding Data Dictionary (based on the dataset “Iris”⁵⁹)

Analysis Folder

Any data should be accompanied by an analysis folder holding (the link to) a **protocol** detailing the steps of data production and analysis, i.e., how you got from sample to raw data to the figure.

Scripts (e.g. Python, R) used to evaluate data and to generate the final output (graphs/figures, etc.) are to be archived together with the original data to which they were applied.

If **script** files/in-house programs, web tools, or similar that have been used to **evaluate** data and/or to **generate** the final figure/graph panel, you need to provide:

- the script itself or a reference if it is published;
- a README on how to use the script, its required system environment, etc.;
- a README file describing the procedure and the stage at which that tool/software was used, including its version, call parameters, and, if applicable, dependencies.

⁵⁹ Fisher RA. (1988). Iris. UCI Machine Learning Repository. <https://doi.org/10.24432/C56C76>

SPECIFICS OF THESIS DATA PACKAGES

The compilation of data packages of theses essentially **follows the same scheme** as above (incl. folder structure).

The thesis text is additionally undergoing a **plagiarism** check by the external company (does not apply to publication manuscripts).

It is expectable that thesis data packages **require more storage space** than those of manuscripts. For such large data packages an upload space is available upon request – allow enough time to organize this.

For further information, milestones, timeline, etc., please refer to the “**Rules for PhD Thesis Submission**”, ⇨ [Appendix K](#).

J — CHECKLIST TO COMPILE A PUBLICATION DATA PACKAGE

Last Update 2024-03

Please make sure that you have checked all boxes to avoid losing time in the process!

NOTE: “Figure” refers here to any data presentation/visualization in the manuscript/thesis, i.e., any **figure, plot, graph, table, image, panel.**

GWP-ID received

If applicable: FLI publication form is included with the delivery of the data package

General data package folder structure adheres to the “How-to” (⇒ [Appendix J](#)). If not, this has been communicated with research coordination.

Metadata file is filled in and included

All files/folders/subfolders are organized and named in a self-explanatory way

Optional but recommended: File documenting the file naming scheme is included

Manuscript included as word processor file (including Supplementary Material)

Manuscript included as pdf file (including Supplementary Material)

All figures of the manuscript and its supplement are accounted for: figure folder, including

Figure is stored in stored in high-resolution pixel-based format (.tiff, large .png, etc.; .pdf is possible – NO .jpeg!)

Larger version of figure included if necessary

Figure caption

Figure README (filled in)

Original data folder

Analysis folder

-
- Original data folder of each figure complete
 - Tabular data used to generate figure stored in individual files in .xlsx format
 - Optional but recommended:* Tabular data additionally stored in .csv or .tsv format
 - Each tabular data set is accompanied by its corresponding dictionary
 - Image original data files (microscopic images, uncropped blots, gels, etc.) are stored in high-resolution .tiff or .png
 - Image original data file in proprietary format is included
-
- All external data (e.g., from public servers or already archived in fliDA) accounted for by link in ExternalData.txt
-
- If applicable:* Replicate data folder of each figure complete
-
- Analysis folder of each figure complete
 - If applicable:* Script files/in-house programs or similar used to evaluate data and/or generate the final figure included
 - If applicable:* README for each script on how to use it, its required system environment, etc.) included
 - If applicable:* Link to / copy of relevant ELN entries included
-
- Other particularities documented by a clear README file
-
- IF you want to deliver your archive via link, make sure you have enough space on fli-share. Otherwise use an external USB-hard disk/USB-stick – or contact research coordination well in advance.
-

K — RULES FOR PHD THESIS SUBMISSION

Last Update 2024-03

These rules apply from January 1st 2024 onwards and are an integral part of the submission of a PhD thesis. They intend to safeguard compliance of the PhD thesis with good research practice (GRP) according to the Leibniz Association guidelines⁶⁰, the Deutsche Forschungsgemeinschaft (DFG) guidelines⁶¹ as well as the FLI Guidelines of GRP⁶². Comprehensive information is available on the FLI intranet⁶³.

Please contact the LGSA coordination office with any issue you may have relating to your thesis.

CONTENTS

- SUMMARY
- MILESTONES AND TIMELINE
- THE ABS PROCEDURE
- UNIVERSITY REQUIREMENTS

SUMMARY

The PhD thesis is a research output. The **principles of good research practice**, as set out in the FLI Guidelines of GRP⁶², are to be followed throughout the entire PhD project. Read about the details especially in its chapters 2 to 5.

Review the following carefully before and during the writing of the thesis. Doctoral candidates and supervisors must sign the **FLI Dissertation Submission Form**⁶⁴ to confirm that they meet the requirements before submitting the thesis for the ABS review. For preparing the submission, it is recommended to use the checklist in ⇒ **Appendix J**.

⁶⁰ Leibniz Gemeinschaft. (2021). Leibniz Code for Good Research Practice (PDF). Last accessed: 2024-03-19. https://www.leibniz-gemeinschaft.de/fileadmin/user_upload/Bilder_und_Downloads/%C3%9Cber_uns/Gute_wissenschaftliche_Praxis/Leibniz_Co_de_for_Good_Research_Practice.pdf

⁶¹ Deutsche Forschungsgemeinschaft. (2019). Guidelines for Safeguarding Good Research Practice. Code of Conduct. Zenodo. <https://zenodo.org/doi/10.5281/zenodo.3923601>

⁶² Briest W. *et al.* (2023). Guidelines of Good Research Practice at the Leibniz Institute on Aging – Fritz Lipmann Institute. Zenodo. <https://zenodo.org/doi/10.5281/zenodo.8276433>

⁶³ FLI-internal LGSA Information. Last accessed: 2024-03-19. <http://www2.leibniz-fli.de/internals/phd/index.html>

⁶⁴ FLI-internal LGSA Dissertation Submission Form (PDF). Last accessed: 2024-03-19. http://www2.leibniz-fli.de/internals/phd/FLI%20Dissertation%20Submission%20Form_V1%2012_23.pdf

The following points summarize aspects of the checklist:

- Critically and consistently examine the **validity** and **reproducibility** of all experimental results.
- Be stringently **honest** regarding the **contributions** of collaborators as well as including external funding providers.
- Observe the intellectual **contributorship** of others and appropriately highlight all **citations** and appropriations in all publications.
- **Cite your own publication(s)** or thesis appropriately to avoid self-plagiarism, and independent of its current publication status. Unpublished manuscripts must be clearly labeled (i.e., “in press”, “accepted”, “in revision”, “submitted”, “in preparation”). If parts of a publication or dissertation (figures, text passages, etc.) are directly reused, a reference must be made in the same way as for all other publications used. The dissertation must be included in the **bibliography** and may be cited, e.g., as follows:
 - “Family Name, First name (Year): Titel of the thesis. Dissertation, name of the university“.
 - If large parts of the results of a dissertation or publication have **already been published** elsewhere, this should be **stated in the introduction**, at the beginning of the results section or as footnotes. Examples for the statements are:
 - “This thesis is based on the following publication” followed by the citation or journal and date, or
 - “This paper is based on the doctoral thesis” followed by the citation.
 - Further examples and references are published, for example, by the Office for Research Integrity of the Charité⁶⁵.
- All stages, materials, methods and results of the study are fully **documented** and described in appropriate detail (see FLI Guidelines of GRP ⇒ **Chapter 4.3** and ⇒ **Appendix B**)
- If **animal experiments** are included all licenses/ permits are clearly documented.
- All **original data**, including computer scripts for data evaluation, are stored in an accessible format for archiving for a minimum of 10 years after graduation (see FLI Guidelines of GRP ⇒ **Chapter 4** and ⇒ **Appendix C** for background information, and ⇒ **Appendix H**, ⇒ **Appendix I**, and ⇒ **Appendix J** for implementation rules and advice).

⁶⁵ Charité Universitätsmedizin Berlin. (2023). Reusing your own scientific publications in your thesis. (PDF). Last accessed: 2024-03-19. https://www.charite.de/fileadmin/user_upload/portal_relaunch/forschung/GutWissPraxis/Reusing_Your_Own_Scientific_Publications_In_Your_Thesis.pdf; and Charité Universitätsmedizin Berlin. Office for Research Integrity. Last accessed: 2024-03-19. https://www.charite.de/en/research/research_support_services/office_for_research_integrity/

MILESTONES AND TIMELINE FOR THE REVIEW OF THE PHD THESIS

Doctoral candidates should keep holiday seasons, typical vacation periods and public holidays in mind when **planning the timeline**.

Milestones for thesis submission:

at the latest 6 weeks prior to thesis submission at the university:

Announcement of thesis submission to the LGSA coordination office and discussion of the appropriate time plan for internal and external checking.

4 weeks prior to thesis submission at the university:

Contact the LGSA office or the ABS officer to find out the latest date for submission for the external checking (assessment before submission – ABS). The **processing time depends on the number of theses submitted concurrently**. The external checking needs at least 4 business days for one and additional 3 days per each additional thesis.

At latest 2 weeks prior to thesis submission at the university, or at the confirmed last date for submission (see above):

The final version of the thesis ready for submission at university including additional files, original data and the checklist must be **submitted to the ABS officer** (see ABS procedure below).

Please be aware that:

- during and after the **ABS procedure, no changes** of the thesis are **allowed** without the ABS officer's consent;
- checking of a thesis takes at least 5 business days, add time for potential corrections.

For **foreseeable unavailability** of the **ABS officer** or the **ABS company**: first, timely announcement of the thesis to the ABS officer allows to cater for most periods of unavailability. Second, a deputy ABS officer can cover for other phases.

Contingency plan for unforeseeable unavailability of the ABS officer or the ABS company: the LGSA office and the PhD candidate organize and agree on a replacement or a different procedure.

Thus, it is thus strongly recommended to start the process of checking a thesis well before the intended submission date!

THE ABS PROCEDURE

The thesis will be independently and **confidentially assessed** by electronic means **for image manipulations, plagiarism and soundness of statistical data** by an external company. To check for soundness of statistical data and graphs (e.g., bar graphs, curves), submission of the immediate data in the form of a spreadsheet file (e.g., MS Excel or GraphPad Prism) to re-produce those graphs/curves is required.

It is recommended to contact the ABS officer concerning questions or possible revisions of the thesis before submission.

For the ABS Check

Thesis and Data Package

Prepare your package with the final **thesis** and the **data** according to the FLI Guidelines of GRP:

- ⇒ **Appendix H — Rules** for Archiving and External Assessment Before Submission (ABS) of Publication-Relevant Data,
- ⇒ **Appendix I — “How-To”** for Archiving and External Assessment Before Submission (ABS) of Publications and Theses including templates, and
- ⇒ **Appendix J — Checklist** to Compile a Publication/Thesis Data Package. Please make sure that you have checked all boxes in the checklist of Appendix K to avoid losing time in the process.

Submission Form

Finish pages 1 and 2 of the **FLI Dissertation Submission Form**⁶⁶ with **signatures** on both pages.

Submission to ABS office

Submit the submission **form** together with your thesis **data package** (see above) to the **ABS officer** at the latest two weeks before the intended submission at the university. Your files will be checked for completeness and samples of the thesis data will be provided to the external checking company.

ABS Check Results

The ABS check result will be transferred confidentially and kept in the respective data archive for at least 10 years.

⁶⁶ FLI-internal LGSA Dissertation Submission Form (PDF). Last accessed: 2024-03-19. http://www2.leibniz-fli.de/internals/phd/FLI%20Dissertation%20Submission%20Form_V1%2012_23.pdf

The ABS results are categorized in the cases as follows.

CASE 1

The archive appears sufficient and no GSP issues were found. The ABS officer confirms with their signature that the thesis can be submitted to the university. This case can also include possible requests for additional data or explanations or original data to allow a proper check.

If there are **issues** to be resolved (all **following cases**), **submission** at this stage is **NOT possible**.

CASE 2

Minor corrections in the dissertation are necessary. The ABS officer discusses the necessary changes with the doctoral candidate. Minor corrections of e.g., simple unintended errors, must be addressed accordingly. Such correction(s) are documented in the form and the ABS officer is to be informed about them. Subsequently, the ABS officer confirms the implementation and permission to submit to the university with their signature.

Cases 2 and 3 can occur in parallel.

CASE 3

The original data archive needs correction/restructuring. The ABS officer discusses the necessary changes with the doctoral candidate. Such correction(s) are documented in the form by the ABS officer. The ABS officer confirms the implementation and permission to submit to the university with their signature.

More severe issues fall under **Case 4** and/or contain suspected scientific **misconduct**. Here, even if the issues are addressed in full, the **ABS process must be started again** to go forward with the thesis submission.

CASE 4

The thesis needs major corrections (e.g., re-working of an entire graph / figure / panel / table) or sufficient original **data are not archived and/or are not available**, but there is no suspicion of scientific misconduct. In this situation, the case is reported to the supervisor, and it is decided whether the TAC needs to be involved. When all issues have been appropriately addressed, a new ASB check is possible after consultation between the parties involved.

It must be clarified whether major corrections are required (Case 4), if the TAC needs to be involved, or if a *bona fide* case of scientific misconduct (see below) is to be dealt with.

CASE OF SUSPECTED MISCONDUCT

In case of a **suspicion of scientific misconduct** (e.g., forgery, manipulation, plagiarism), the ABS officer contacts an ombudsperson. The ombudsperson initiates the according procedure, (see FLI Guidelines of GRP ⇒ [Chapter 10](#)).

In all cases, the PhD candidate receives a digital copy of the FLI Dissertation Submission Form⁶⁴. The **results of the external checking** will be documented on page 3 of the form and communicated to the PhD candidate via email. The ABS officer keeps the form in the archive for at least 10 years.

Final Submissions

The PhD candidate **informs** the LGSA office immediately when the thesis has been **submitted to the university** to open the examination procedure.

After the defense and publication of the dissertation at the university library, the doctoral candidate **submits a PDF** file of the published version **to the LGSA office**. If changes are made to the dissertation between defense and publication that also affect the original data, these **changes** will be **reported** to the ABS Officer or Research Coordinator and the data will be **added to the archive**.

UNIVERSITY REQUIREMENTS

Please double **check** early enough **with the university**, which material you have to provide together with your thesis.

The Faculty of Biological Sciences of the Friedrich Schiller University Jena (FSU), for instance, would like to have a declaration about the use of animal experiments. In case you have performed animal experiments for your thesis, the appropriate animal license must be included in the submission package for the university.

You can find information on submission requirements at the relevant websites, e.g., of the Doctoral Studies Office of the Faculty of Biological Sciences of the FSU⁶⁷.

⁶⁷ Friedrich Schiller Universität Jena. Faculty of Biological Sciences. Doctoral Studies Office of the Faculty of Biological Sciences of the FSU. (Website). Last accessed: 2024-03-19. <https://www.bio.uni-jena.de/en/graduate-studies-habilitation-office>