robotics

Swiss National
Centre of Competence
in Research

NCCR ROBOTICS Research Data Management Strategy: A Workflow Application

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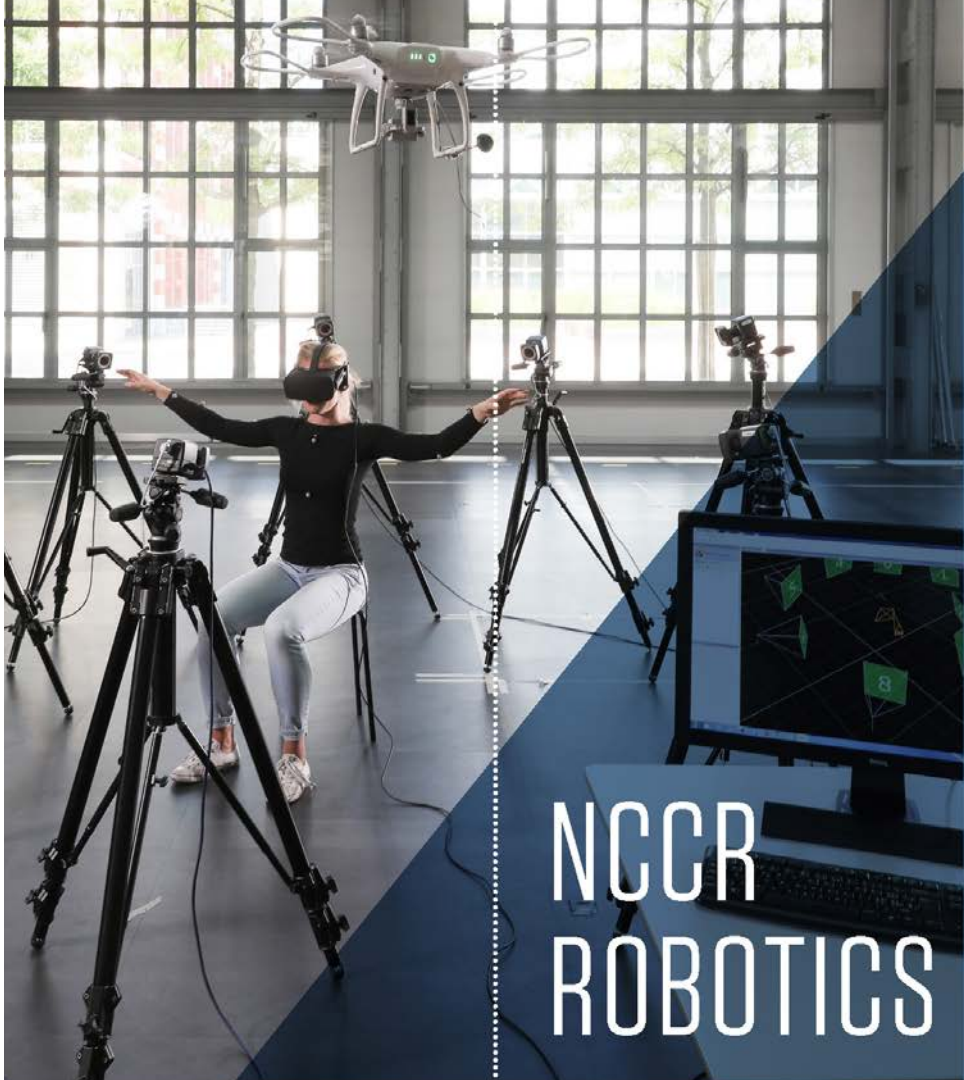
FNSNF
FONDS NATIONAL SUISSE
SCHWEIZERISCHER NATIONALFONDS
FONDO NAZIONALE SVIZZERO
SWISS NATIONAL SCIENCE FOUNDATION



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Swiss National
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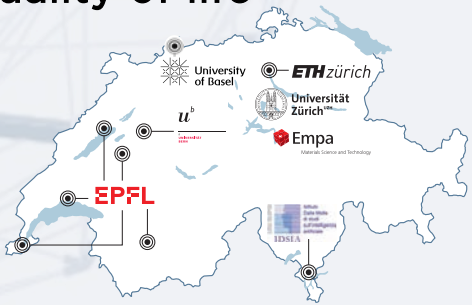
Swiss National Science Foundation

NCCR ROBOTICS

National Centre of Competence in Research

Developing intelligent robots for improving the quality of life



EPFL ETH zürich Universität Zürich IDSIA Empa University of Basel

EPFL

D. Floreano
Flying robots

A. Billard
Humanoids & learning

G. Courtine
Neuroscience

P. Dillenbourg
Educational technologies

A. Ijspeert
Legged robots

S. Lacour
Bioelectronics

S. Micera
Neuroprosthetics

F. Mondada
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J. Paik
Reconfigurable

H. Shea
Soft transducers

A. Alahi
Visual intelligence for transportation

D. Atienza
Embeded systems

O. Blanke
Cognitive neuroprosthetics

S. Sakar
Micro-bio-robotics

ETH zürich

R. Riener
Rehabilitation robots

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Robot vision

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Prosthetics robots

M. Hutter
Legged robots

R. Siegwart
Autonomous robots

O. Bar-Nur
Regenerative & movement biology

S. Coros
Computational robotics

S. Raspopovic
Neuroprosthetics

USI SUPSI
Istituto Dalle Molle di studi sull'intelligenza artificiale
IDSIA

L. Gambardella
Swarm robotics

Empa
Materials Science and Technology

M. Kovac
Flying & soft robotics

L. Marchal-Crespo
Robotic assistance

Universität Zürich[UZH]

T. Delbruck
Neuromorphic

D. Scaramuzza
Robot vision

University of Basel

G. Rauter
Biomedical

WHAT WE DO

We are at the forefront of robotics research and develop robots that co-exist symbiotically with humans in order to enable them to help both individuals and society.

We aim at achieving structural impact in robotics through:

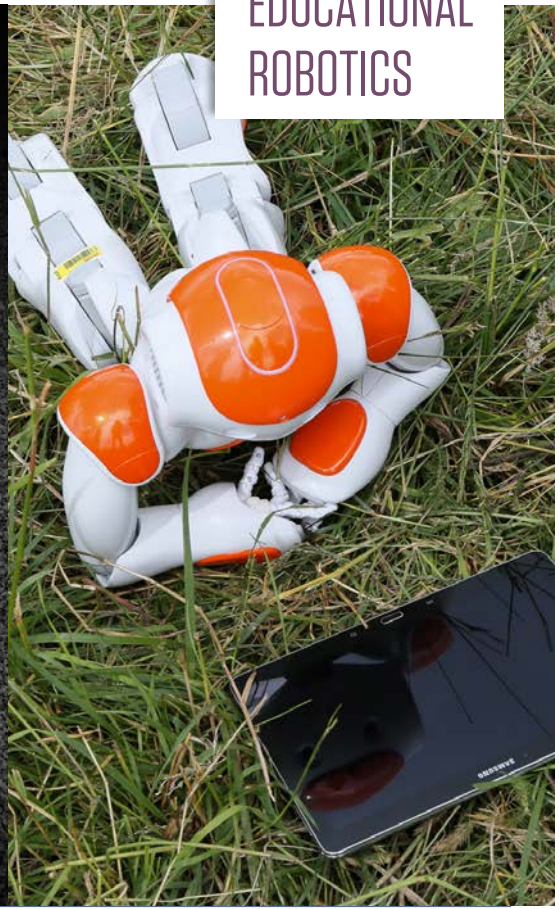
- Research
- Education
- Equal Opportunities
- Knowledge and Technology Transfer
- Outreach

RESEARCH GRAND CHALLENGES

WEARABLE ROBOTICS

RESCUE ROBOTICS

EDUCATIONAL ROBOTICS



Research Data Management Strategy

Developed in 2019 as part of its contractual obligation.

Synergy with the EPFL Library, and the EPFL Legal and Ethics Departments.

The RDMS aims at contributing to recognize research data as valuable academic resources that need to be managed, shared and preserved to foster research and science.

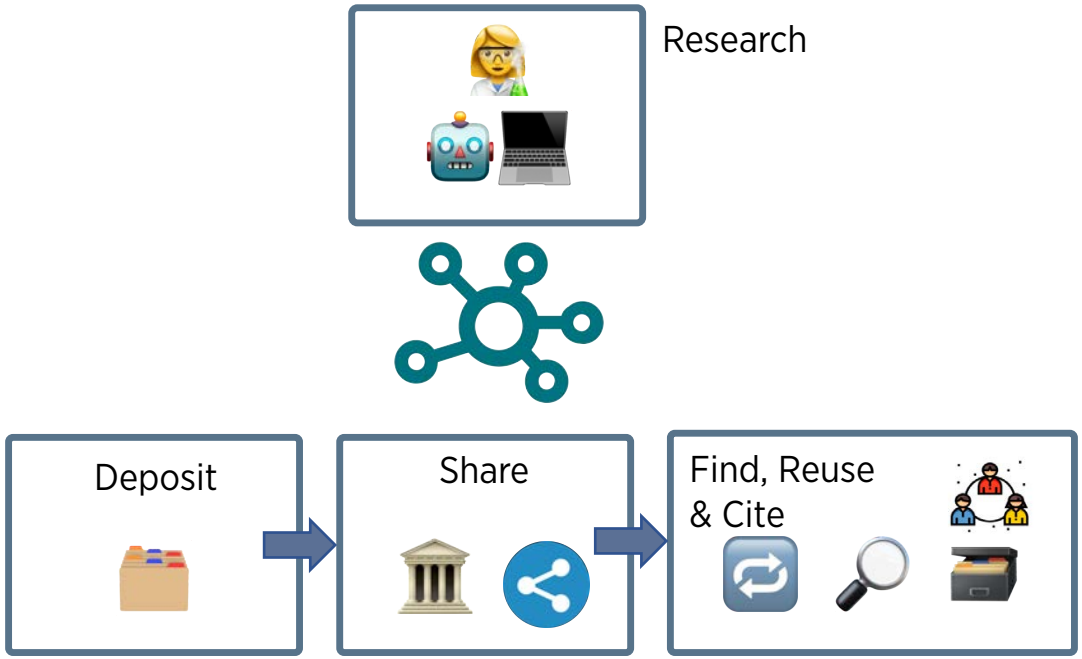
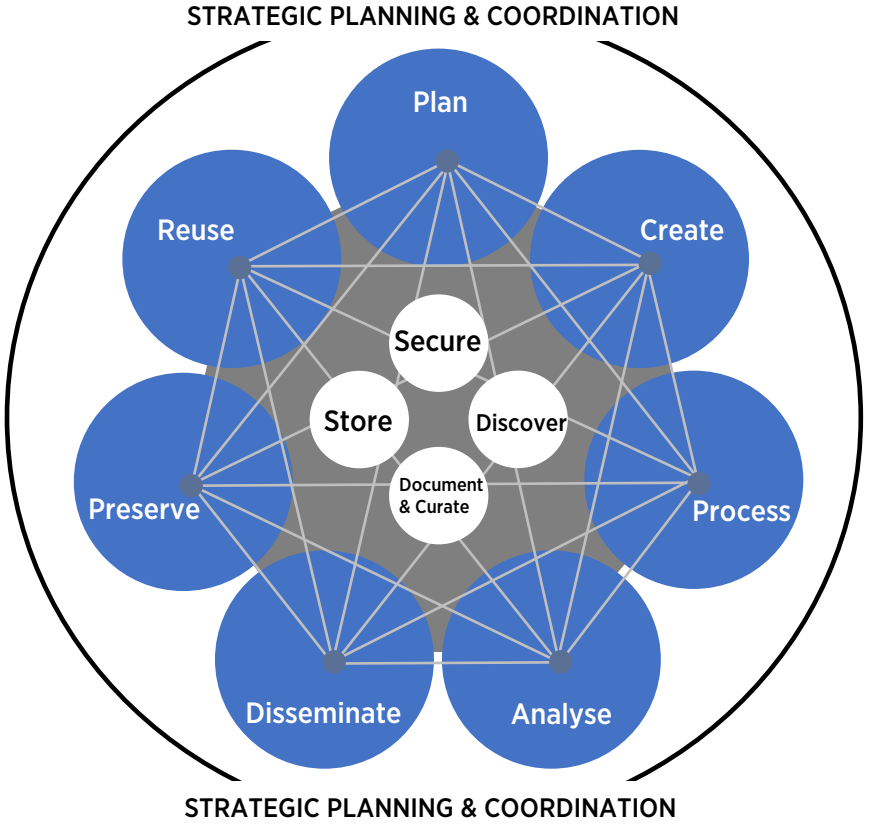


Image source: https://www.labfolder.com/guide-research-data-management/

The Research Lifecycle and RDM Functions

Research Data Management (RDM) is the overarching process that guides researchers throughout the different stages of the data lifecycle, enabling scientists and all other involved stakeholders to make the most out of the generated research data.



Data-Related Activities During the Research Process.
Image Source: *Advanced Research Computing (ARC) Position Paper: For Innovation, Science, and Economic Development Canada.* Leadership Council for Digital Infrastructure. Unpublished manuscript. August 31, 2017, 5.)

FAIR principles

outcome of a joint declaration of a diverse set of stakeholders (including SNSF, EC, etc), and they define how research data should be: Findable, Accessible, Interoperable and Reusable.

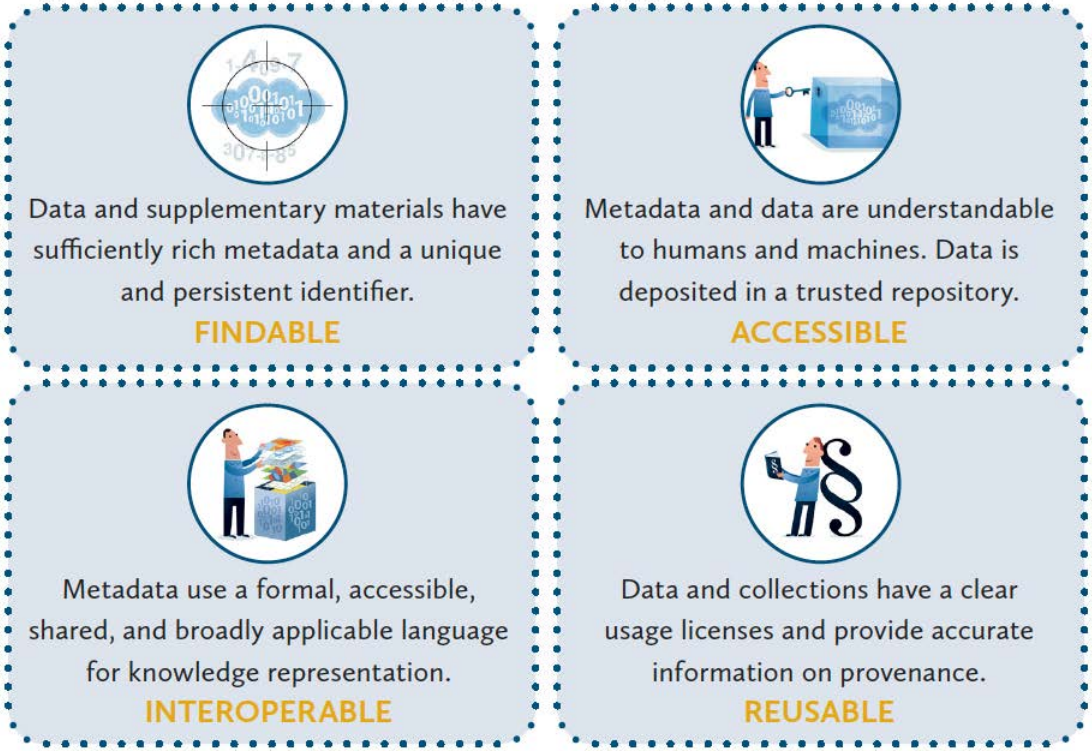


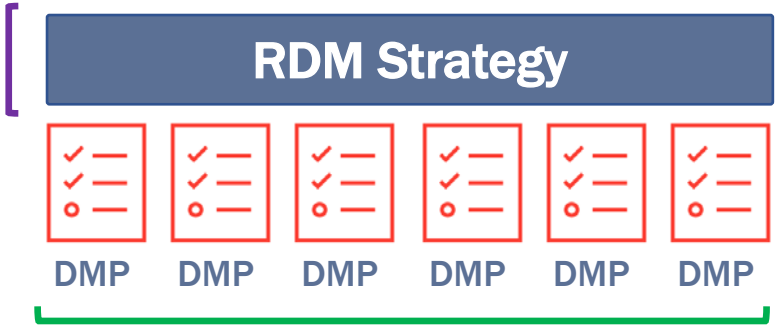
Image source: www.libereurope.eu Ligue des Bibliothèques Européennes de Recherche Association of European Research Libraries

Why is research data management important for researchers?

- **Plan:** future needs (material, software, HR, ...)
- **Science:** impact, better reproducibility, posterity
- **Data reuse:** better use of public funds
- **Openness:** impact, transparency, accountability
- **Visibility:** citations, collaborations, career
- **Compliancy:** law (ex. GDPR), funders (ex. SNSF)
- **Efficiency:** ROI for the lab and beyond
- **Modernity:** world scale digital research, bigdata

Image source: www.labfolder.com/guide-research-data-management

EPFL
DOI: 10.5281/zenodo.3327829

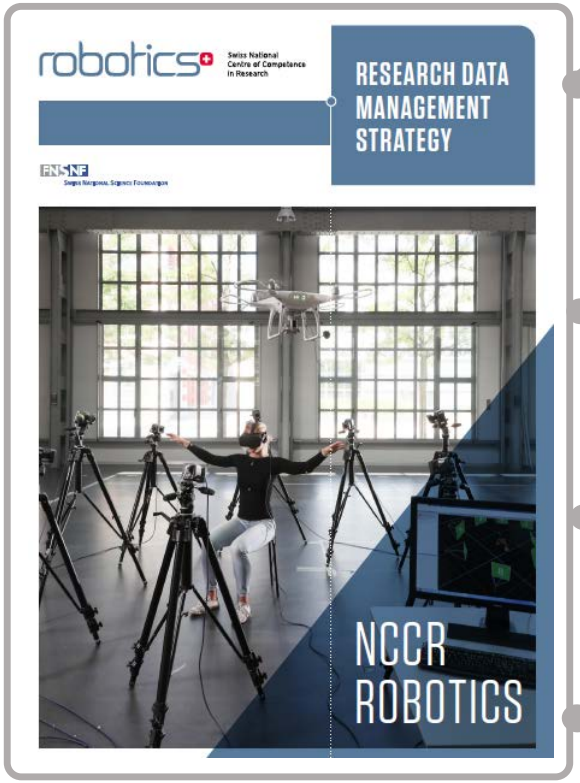


Information and training activities for NCCR members regarding SNSF/NCCR data management policy and requirements

NCCR Robotics RDM Officer

Maintenance of the data management infrastructures, data backup and preparation, curation and documentation of datasets, submission of datasets on repositories

NCCR Robotics Labs



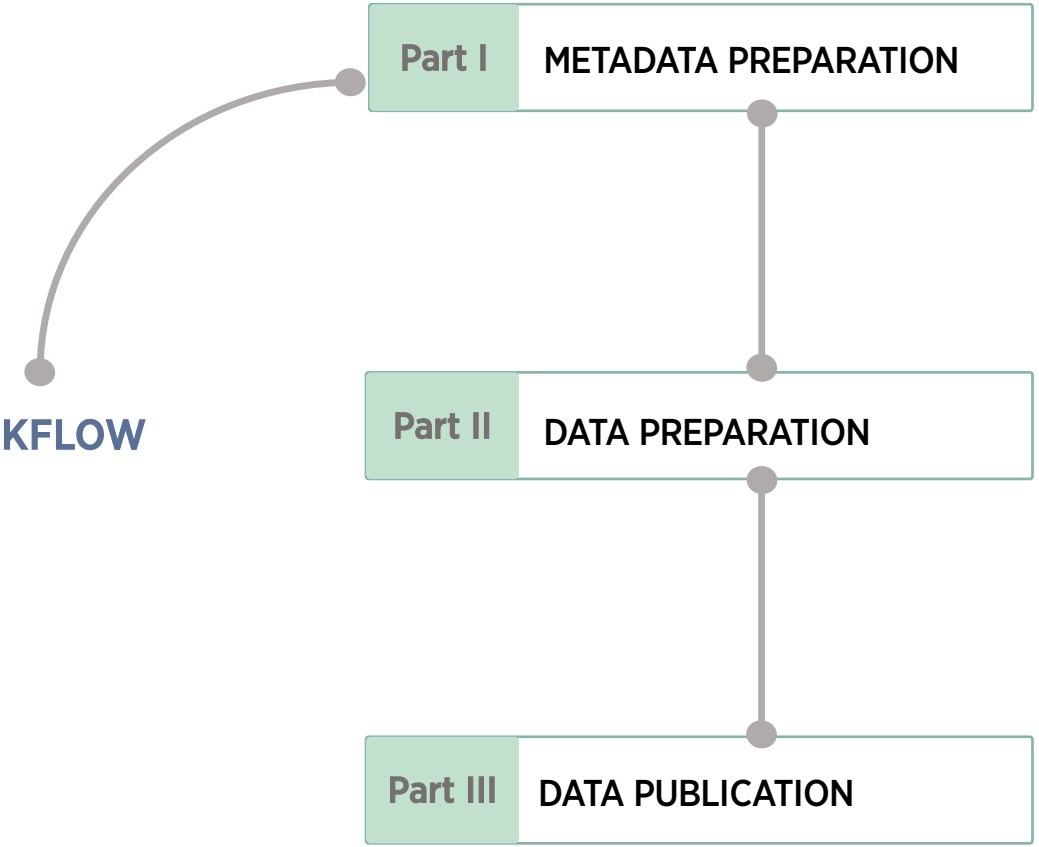
Gr. 1 describes the strategy for researchers handling non-protected and non-sensitive data

Gr. 2 applies for the laboratories that handle sensitive data

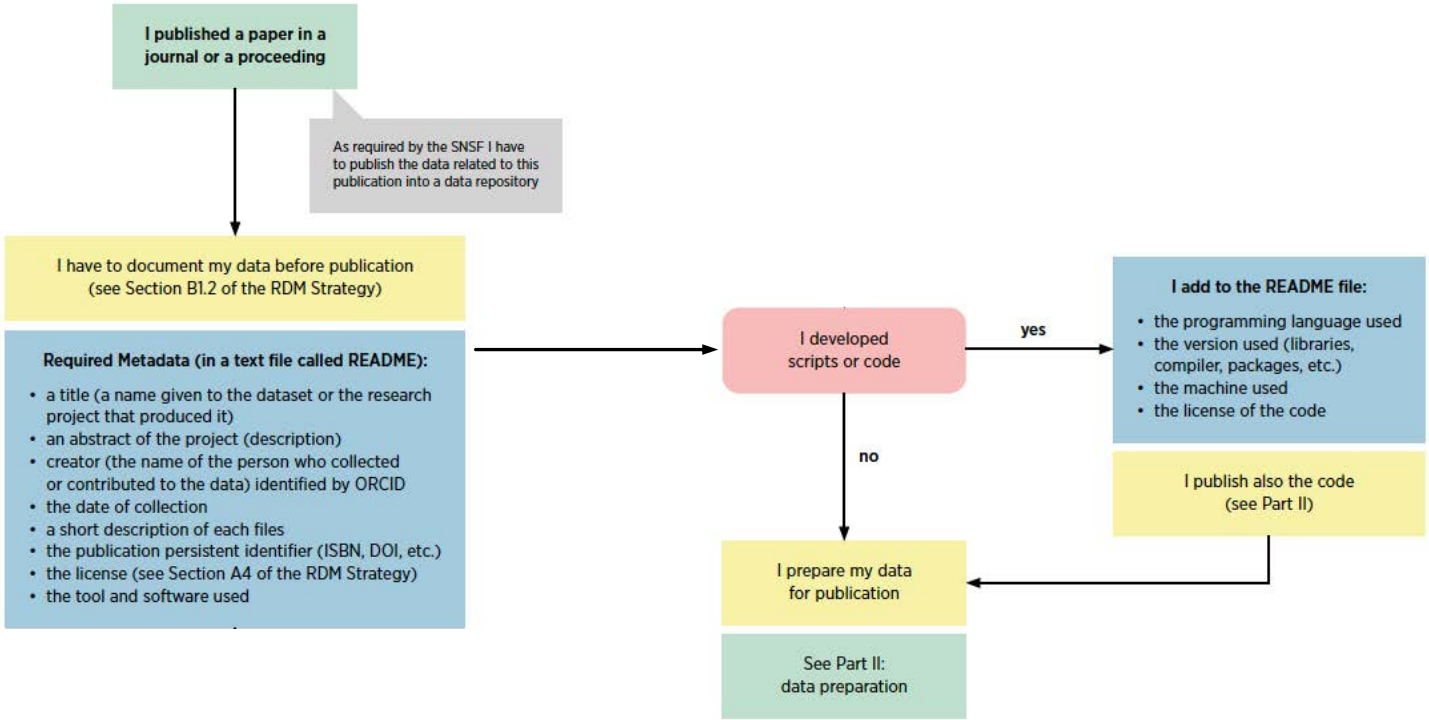
Gr. 3 applies for the laboratories that handle protected data

Gr. 4 applies for the laboratories that handle both sensitive data and protected data

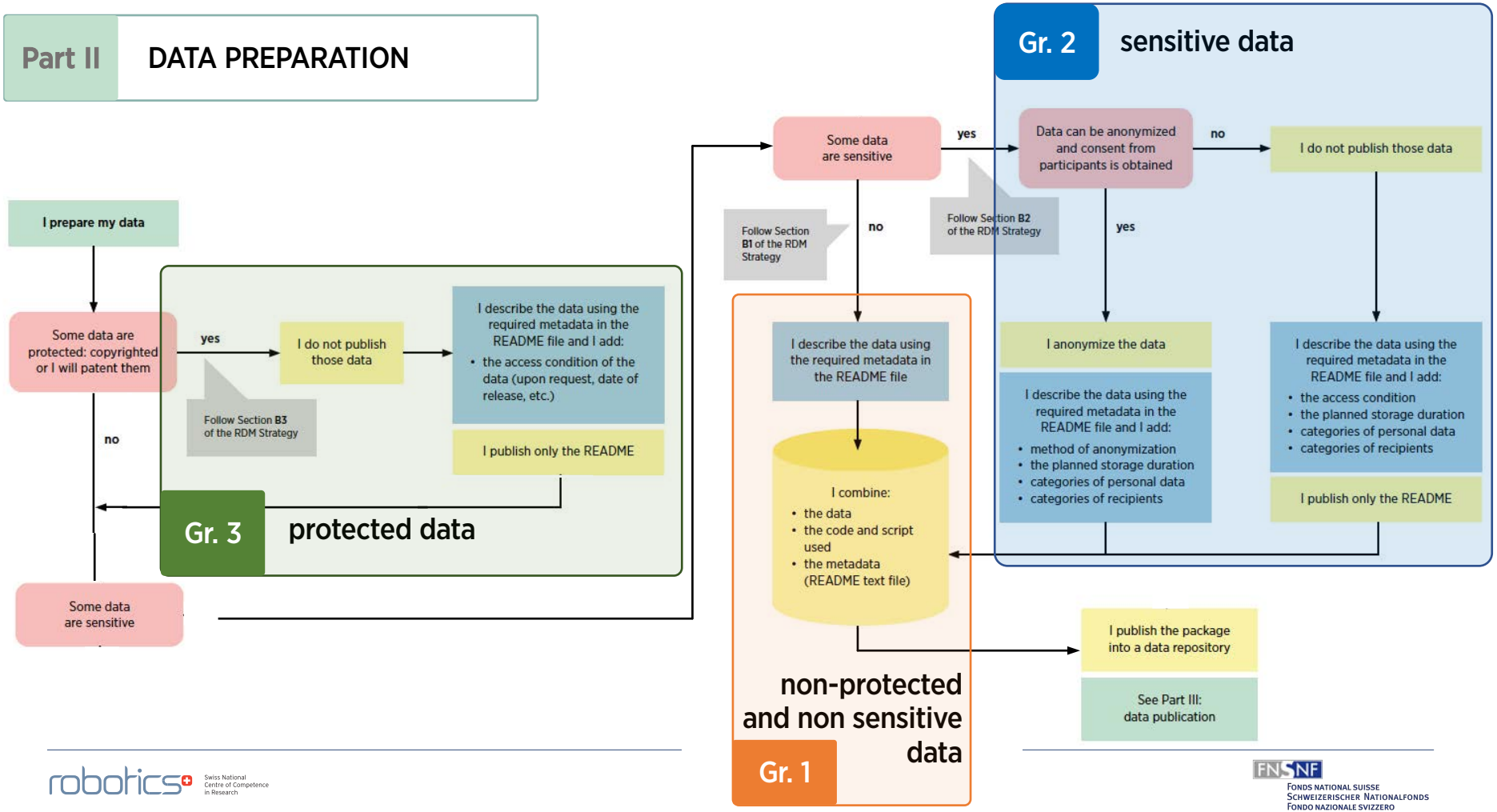
DATA PUBLICATION WORKFLOW



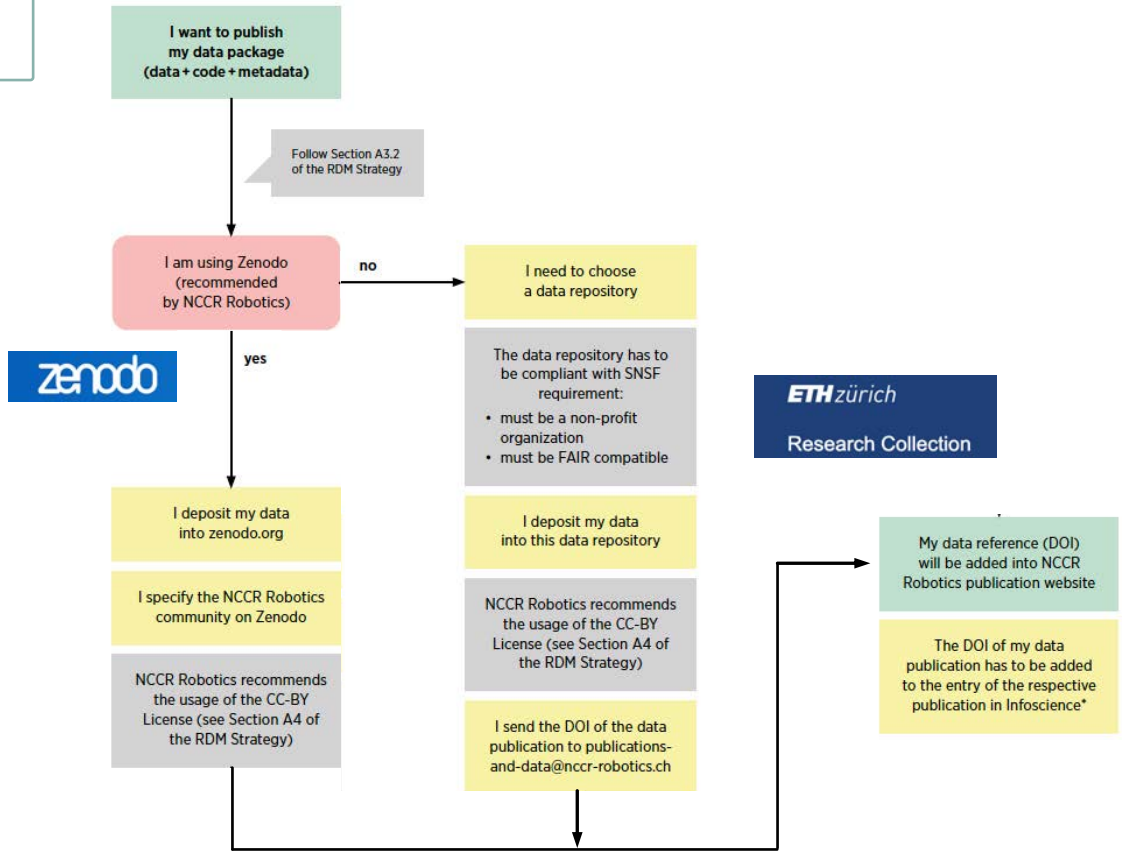
Part I METADATA PREPARATION



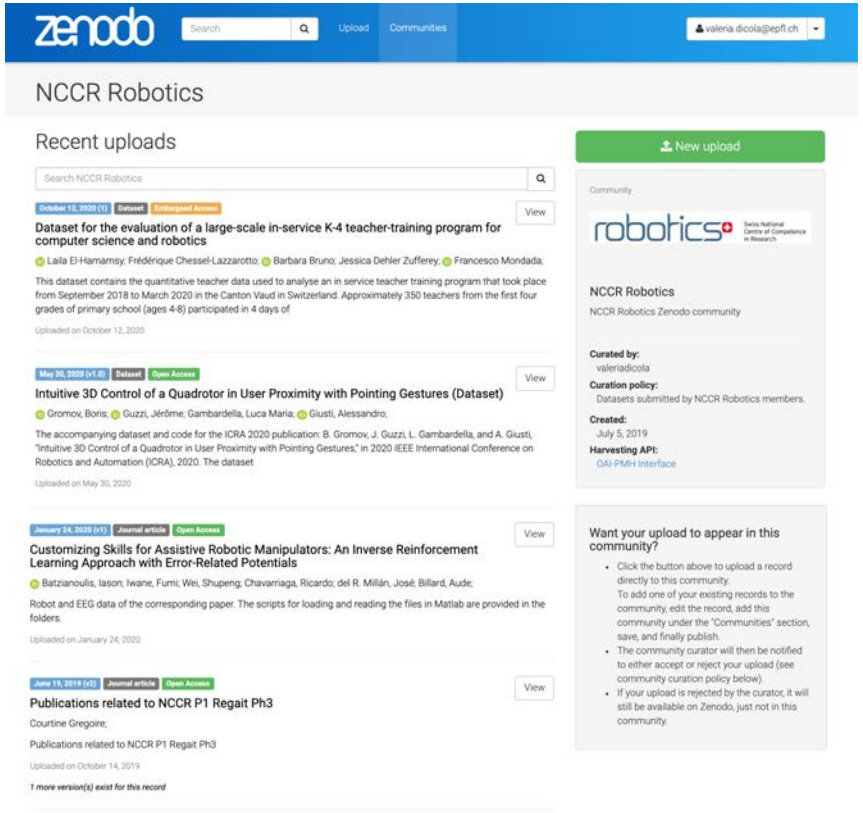
Part II DATA PREPARATION



Part III DATA PUBLICATION



PUBLIC DATA SHARING LOCATION



- FAIR
- Free of charges
- Max 50GB/dataset (unlimited datasets)
- Automated DOI assignment

- GitHub integration

- All file formats accepted
- Usage statistics interface

zenodo.org/communities/nccrrobotics/

Additional Information

- File formats extensions for reusability/preservation
- Collaborative Storage and File sharing (Switch Drive, Google Drive)
- Adequate data and code licenses

TYPE OF DATA	APPROPRIATE	ACCEPTABLE	DEPRECATED
Tabular (extensive metadata)	CSV – HDF5	TXT – HTML – TEX – FASTQ [1] – POR	
Tabular (minimal metadata)	CSV – TAB – ODS – SQL – TSV	XML (if appropriate DTD) – XLSX	XLS – XLSB
Textual / Presentation	TXT – PDF – ODT – ODM – TEX – MD – HTM – XML – EXTXYZ [2] – ODF	PPTX – RTF – DOCX – PDF (with embedded forms) – EPS – JPF	DOC – PPT – DVI – PS
Code / Computation	M – R – PY – IYPNB – RSTUDIO – RMD – NETCDF – AIML	SDD	MAT – RDATA
Image & Spectroscopy	TIF – PNG – SVG – JPEG – FITS	JCAMP – JPG – JPZ – TIF – TIFF – PDF – GIF – BMP – DM3 – OIR – LSM [3]	INDD – AIT – PSD – SPC
Audio	FLAC – WAV – OGG – MXL – MIDI – MEI – HUMDRUM	MP3 – AIF	
Video	MP4 – MJ2 – AVI – MKV	OGM – MP4 – WEBM	WMV – MOV – QT
Geospatial	NETCDF – tabular GIS attribute data – SHP – SHX – DBF – PRJ – SBX – SBN – POSTGIS – TIF – TFW – GEOJSON	MDB – MIF	
3D structures & images	X3D – X3DV – X3DB – PDF3D – POV – PDBML	DWG – DXF – PDB	PXP
Generic	XML – JSON – RDF		

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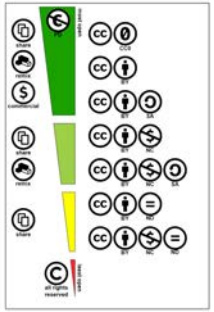
SWITCH vs.



NCCR Robotics RDMS implementation in numbers

- Implemented virtually in 2020 during 4 months
- Over **28 Labs** (with 1 hour presentations)
- Taken by more than 100 NCCR Robotics researchers
- Synergy between 3 institutional Libraries

EPFL ETH zürich ETH Library University of Zurich[UZH]

- Antoine Masson
- Eliane Blumer

Recommendations

1. Share any data that is relevant for re-use.
2. Data underlying publications must be made available at the time of the publication.
3. Wider data can be made available after the project ends.

Diaz, P., Stam, A. (2019). How to draft a DMP from the perspective of the social sciences, using the SNSF template. FORS Guide No. 07, Version 1.0. Lausanne: Swiss Centre of Expertise in the Social Sciences FORS. doi:10.24449/FG-2019-00007

Thank you!!! 😊

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