H2020-FETPROACT-2018-01

GrowBot – Towards a new generation of plant-inspired growing artefacts

Deliverable 1.4

Data Management Plan II

WP1 – Management

Authors: [Francesca Tramacere (IIT), Barbara Mazzolai (IIT), Marc Thielen (ALU_FR), Frederike Klimm (ALU-FR), Thomas Speck (ALU-FR), Yasmine Meroz (TAU), Pablo Vidarte (Bioo), Nicola Tirelli (IIT), Nicholas Rowe (CNRS), Maria Balk (HZG), Marc Behl (HZG), Christin Skala (HZG), Andreas Lendlein (HZG), Cecilia Laschi (SSSA), Michele Palladino (GSSI), Pierangelo Marcati (GSSI), and Stefano Linari (Linari)]

Lead participant: IIT

Delivery date: 1 July 2020

Dissemination level: Public

Type: ORDP: Open Research Data Pilot

GrowBot has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 824074

Revision History

Author Name, Partner short name	Description	Date
All	Final version D1.1	29/07/2019
Marc Thielen, Frederike Klimm and Thomas Speck, ALU-FR	Integrations in DS1 section	17/06/2020
Francesca Tramacere e Barbara Mazzolai, IIT	Add sentence in 3.2 section	30/06/2020

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1 Introduction

This deliverable presents the first version of the Data Management Plan (DMP) for the GrowBot project. This document provides a preliminary analysis of the data management policy to be applied by the Partners to datasets generated within the Project. In particular, the DMP identifies the main data to be generated within GrowBot, outlining the handling of research data during the project as well as how and what parts of the datasets will be openly shared.

This document is intended for consortium internal use, aiming to provide guidance to Project Partners on data management. The DMP is indeed a useful tool to agree on data processing of the GrowBot project, facilitating the creation of a common understanding and, where possible, common practices.

This deliverable is submitted to the European Commission in M7 of the first project year (July 2019, D1.1) and represents a preliminary plan. The document will be further detailed, updated, and corrected in line with the project life cycle.

The document follows the EC guidelines and templates for project participating in the open Research Data Pilot:

- H2020 Programme – AGA Annotated Model Grant Agreement - Open access to research data[1]
- Guidelines to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon 2020[2]
- Guidelines on FAIR Data Management in Horizon 2020[3]
- Template for the Data Management Plan[4]
- OpenAIRE Research Data Management Briefing Paper[5]
- DCC Checklist for writing a DMP[6]

The present Data Management Plan also reflects the provisions established by the project contracts and complements the project exploitation, dissemination and IPR procedures and decisions defined in different deliverables.
The relationship between the DMP and each key document are described below in Table 1.

1.1 Objectives

According to the EC Guidelines on Data Management in Horizon 2020, scientific research data should be findable, accessible, interoperable and re-usable (FAIR):

- **Findable:** Are the data produced and/or used in the project discoverable with metadata, identifiable and locatable by means of a standard identification mechanism (e.g. persistent and unique identifiers such as Digital Object Identifiers)?
- **Accessible:** Are the data and associated software produced and/or used in the project accessible and in what modalities, scope, licenses (e.g. licencing framework for research and education, embargo periods, commercial exploitation, etc.)?

[1] Version 5.2, 26 June 2019: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/amga/h2020-amga_en.pdf
[2] Version 3.2, March 2017: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf
[3] Version 3.0, July 2016: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf
[4] Version 1.0, October 2016: http://ec.europa.eu/research/participants/data/ref/h2020/gm/reporting/h2020-tpl-oa-data-mgt-plan_en.docx
[5] April 2017, https://www.openaire.eu/briefpaper-rdm-infonoads
[6] Version 4.0, 2014: http://www.dcc.ac.uk/webfm_send/1279

- **Interoperable:** Are the data produced and/or used in the project interoperable, that is allowing data exchange and re-use between researchers, institutions, organisations, countries, etc. (i.e. adhering to standards for formats, as much as possible compliant with available [open] software applications, and in particular facilitating re-combinations with different datasets from different origins)?
- **Re-usable:** Are the data produced and/or used in the project useable by third parties, in particular after the end of the project?

Table 1. **Relation to project key documents and deliverables**

Document	**Access**[7]	**Availability**	**Relationship to GrowBot DMP**
Grant Agreement: core text	Confidential	• Participant portal; • GrowBot repository[8]	• Article 27 details the obligation to protect results (27.1) and of providing information on EU funding (27.3) • Article 29 details the obligation to disseminate results, defines open access to research data (29.3) as well as the obligation to provide information on EU funding (29.4) and to exclude Commission responsibility via a disclaimer (29.5) • Article 36 details confidentiality obligations • Article 37 details security-related obligations • Article 39 details obligations to protect personal data
Consortium Agreement	Consortium	• GrowBot repository	Chapter 4.1 on the General principles: "Each Party undertakes to take part in the efficient implementation of the Project, and to cooperate, perform and fulfil, promptly and on time, all of its obligations under the Grant Agreement and this Consortium Agreement as may be reasonably required from it and in a manner of good faith as prescribed by Belgian law. Each Party undertakes to notify promptly, in accordance with the governance structure of the Project, any significant information, fact, problem or delay likely to affect the Project. Each Party shall promptly provide all information reasonably required by a Consortium Body or by the Coordinator to carry out its tasks. Each Party shall take reasonable measures to ensure the accuracy of any information or materials it supplies to the other Parties." This is a general declaration of the partners to abide by the rights and obligations set out in the Grant Agreement.

[7] Confidential: limited to Consortium, European Commission, appointed external evaluators and other EU bodies; Consortium: originally conceived as consortium but can be made available to European Commission, appointed external evaluators and other EU bodies if necessary; Public: public and fully open availability

[8] https://www.growbot.eu/login

Dissemination plan (D11.2)	Public	• Participant portal; • GrowBot repository	The deliverable deals with a detailed definition of the strategy, the planned activities outlined in Dissemination, Communication, and Exploitation WP (WP11), and their expected impact. The CoDE plan will be periodically updated according to the progress and emerging results of the project, considering changes in the stakeholders, work context and potential use of results during the project lifetime.

1.2 DMP management and update

Four DMP deliverables have to be submitted to the European Commission in M6 (June 2019, D1.1), M18 (June 2020, D1.4), M36 (December 2021, D1.7), and M48 (December 2021, D1.10).

Different versions will be identified by a version number and a date. The version number will be composed of two digits separated by a period: the digit before the period represents in ascending orders the official versions submitted to the European Commission as deliverables; digits after the period represents the periodic internal revisions of such official versions.

Official versions will be stored on the project online repository as PDF files. An editable word copy of the latest version will also be stored to facilitate revision and update of the already identified datasets and policies. If during the project life cycle, a new dataset is identified, partners can submit a new form through the online tool, automatically notifying the coordinator. IIT will then be in charge of updating the document and its annexes, uploading them on the repository and notify the consortium through the project mailing list system.

2 Data summary

2.1 GrowBot datasets

For the first version of the project DMP, the analysis is based on eleven datasets whose key details are summarized in Table 2. The descriptions of each data set are provided in Annex 2.

Table 2. **Preliminary list of GrowBot datasets**

REF	TITLE	PARTNER	DATA TYPE	WP&TASK	~ SIZE
DS1	Biomechanical characterization of selected climbing plants	ALU-FR, CNRS, IIT-CMBR	Experimental	WP3: T3.1, T3.3	50 GB
DS2	Bioinspired robot control	TAU, SSSA, IIT-CMBR, CNRS, ALU-FR, GSSI	Results/analysis	WP3: T3.2 WP6: T6.1, T6.2, T6.3	5 GB
DS3	Networking information model	GSSI	Results/analysis	WP3: T3.4	5 GB
DS4	Microfabricated spinner of responsive materials with attachment capabilities	Linari, IIT-POLBIOM, HZG	Results/analysis	WP4: T4.1, T4.3 WP5: T5.1	5 GB
DS5	Multi-filament deposition mechanism	IIT-CMBR	Results/analysis	WP5 : T5.2	500 MB
DS6	Micro-extrusion prototype	HZG, IIT-POLBIOM	Results/analysis	WP4: T4.2 WP5: T5.3	500 MB
DS7	Soft “searcher-like” robot	IIT-CMBR, SSSA	Results/analysis	WP5: T5.4	1 GB
DS8	Microbial fuel cells (MFCs)	Bioo	Results/analysis	WP7: T7.1	500 MB
DS9	Plant-robot interfaces for energy harvesting	IIT-CMBR	Results/analysis	WP7: T7.2	500 MB
DS10	Robot integration	IIT, All	Experimental	WP8: T8.1, T8.2	10 GB
DS11	Robot validation	CNRS, All	Experimental	WP9: T9.1, T9.2, T9.3, T9.4	10 GB

2.2 General data purpose and utility

The gathered data within the GrowBot project can be useful for several purposes.

Summarising:

- Biological research activities aim at deeply investigating the selected biological models of climbing plants in terms of morphology, physiology, anatomy, attachment capability, and biomechanical features (WP3 - Task 3.1 and Task 3.3). These characteristics are needed for identifying key functional “attributes” for the definition of strategic features of robotic artefacts. At the same time, the accurate investigation of biological models will be important for shedding light on unknown biological issues.
- The research activities on plant behaviour and communication aim at studying and analysing plant behaviour (WP3 - Task 3.2) and communication abilities (WP3 - Task 3.4) in order to design innovative control architecture and networking information models for robots (WP6 - Task 6.1, Task 6.2, and Task 6.3). As in the previous topic, the outcome is twofold because the plant abilities can inspire innovative control algorithm and networking information models; and a rigorous biological investigation will contribute to solving biological questions.
- The research activities on the climbing plants’ attachment strategies will also inspire new technological solutions able to perform reversible or permanent attachment on external

supports. The artefacts can work as a single attachment device or as attachment components of a more complex robotic system (WP4 - Task 4.3).

- The research activities on the development of smart materials (e.g. responsible materials, multifunctional materials, printable materials, etc.) are crucial for the generation and characterization of innovative materials that can be applied in several different fields (e.g. robotics, architecture, environmental monitoring, etc.) (WP4 - Task 4.1, and Task 4.2).
- The research activities in manufacturing aim at designing innovative 3D additive manufacturing techniques able to manage functional materials (4D printing), multi-materials, and microfibers (WP5 – Task 5.1, Task 5.2, and Task 5.3).
- The research activities on soft "searcher-like" robot are focused on the design and development of a searcher robotic probe able to explore the surrounding environment, find an external supports, and perform grasping/attachment tasks (WP5 - Task 5.4). The developed device can be potentially useful as monitoring and grasping components of different robotic platforms.
- The research activities on plant energy harvesting aim at investigating the possibility to gather energy from the aerial and underground structure of the plants (WP7 – Task 7.1 and Task 7.2). In this case, the potential spin-off activities can be several in terms of plant energy characterization and technological outcomes.
- The research activities on characterization and validation of materials and prototypes (WP8 – Task 8.1 and Task 8.2; and WP9 – Task 9.1, Task 9.2, Task 9.3, and Task 9.4) represent an amazing source of data for other similar researches and stakeholders. These activities aim to provide standard protocols for the evaluation of the systems' performances.

GrowBot datasets will be a corollary to the scientific publications related to the project. Datasets will be accessible through Zenodo and, when possible, scientific publications will be directly linked to relevant software and data. All these links will be explicitly maintained through the use of digital object identifiers (DOI) associated with scientific papers, datasets and software versions.

A detailed description of each dataset can be found in Annex 2.

GrowBot datasets are expected to have long-term value and utility. They are fundamental for guaranteeing reproducible research and re-use in similar research studies.

Moreover, the gathered data may be potentially useful to several external entities and stakeholders interested in one or more research activities. A preliminary list of third parties that can find fruitful the access to our data:

- Research and scientific community
  - Botany and functional biology
  - Robotics
  - Artificial Intelligence
  - Material Science
  - Computer Science
  - Architecture
  - Rescue
  - Archaeology
- Industry

- Manufacturing
- Environmental monitoring
- Health-care
- Engineering
- Attachment product design
- Design

Last but not least, our results may be potentially interesting as raw data for producing usable education and formative materials. In this case, GrowBot datasets can contribute to both school and higher education of future generations.

2.3 Data technical details: origin, type, formats, and size

In the majority of GrowBot's research activities, the partners will tend not to re-use existing data in the literature, due to the need to address specific project questions, but rather to carry out *ad hoc* experiments and measurements for generating the needed information.

Although several previous studies, especially in the biological field, have already examined and carried out similar GrowBot's investigations, additional and new data are necessary to provide results and information that are directly relevant to the GrowBot objectives.

The data will be gathered by various researchers and different partners as detailed in Table 2 and Annex 2.

The data generated within the project will be both experimental and theoretical, both quantitative and qualitative. Datasets will be generated through various data collection techniques: field work in natural habitats, experiments, observations, and modelling systems.

More in details, GrowBot will generate different categories of data:

- **Raw collected data** – not yet subjected to quality assurance or control
- **Validated collected data** – raw data which have been evaluated for completeness, verified for compliance with the standard operating procedure (data protection included) and validated for specific quality
- **Analysed collected data** – validated data which have been processed and analysed through statistical operations

In order to maximise the dataset interoperability, management and re-use, the GrowBot consortium agreed to use when possible formats that are non-proprietary, unencrypted, uncompressed and in common usage by the research community. Since there are no unique recommendations on best data formats and neither the selected data repository[9] provides such indication, GrowBot partners have agreed to follow - when possible - the indications of the UK Data Archive[10], recommended by OpenAIRE, as indicated in **Table 3**.

[9] As later specified: Zenodo, http://about.zenodo.org/policies/
[10] http://www.data-archive.ac.uk/create-manage/format/formats-table

Table 3**. Data recommended format**

Type of data	Recommended formats	Acceptable formats
Tabular data with extensive metadata (variable labels, code labels, and defined missing values)	• SPSS portable format (.por)	Proprietary formats of statistical packages: • SPSS (.sav), • Stata (.dta), • MS Access (.mdb/.accdb)
Tabular data with minimal metadata (column headings, variable names)	• comma-separated values (.csv) • tab-delimited file (.tab) • delimited text with SQL data definition statements	• delimited text (.txt) with characters not present in data used as delimiters • widely-used formats: - MS Excel (.xls/.xlsx), - MS Access (.mdb/.accdb), - dBase (.dbf), - OpenDocument Spreadsheet (.ods)
Textual data	• Rich Text Format (.rtf) • plain text, ASCII (.txt) Adobe Portable Document Format (PDF/A, PDF) (.pdf)	• Hypertext Mark-up Language (.html) • widely-used formats: MS Word (.doc/.docx) • some software-specific formats: NUD*IST, NVivo and ATLAS.ti
Image data	• TIFF 6.0 uncompressed (.tif)	• JPEG (.jpeg, .jpg, .jp2) if original created in this format • GIF (.gif) • TIFF other versions (.tif, .tiff) • RAW image format (.raw) • Photoshop files (.psd) • BMP (.bmp) • PNG (.png)
Audio data	• Free Lossless Audio Codec (FLAC) (.flac)	• MPEG-1 Audio Layer 3 (.mp3) if original created in this format • Audio Interchange File Format (.aif) • Waveform Audio Format (.wav)
Video data	• MPEG-4 (.mp4) • OGG video (.ogv, .ogg) • motion JPEG 2000 (.mj2)	• AVCHD video (.avchd)
Documentation and scripts	• Rich Text Format (.rtf) • PDF/UA, PDF/A or PDF (.pdf) • XHTML or HTML (.xhtml, .htm) • OpenDocument Text (.odt)	• plain text (.txt) • widely-used formats: - MS Word (.doc/.docx), - MS Excel (.xls/.xlsx)

The project will generate a very large amount of data with an overall size of approximately 48 GB. The Zenodo platform recommends a maximum upload limit of 50 GB. All the 12 datasets should fit into this limit.

The consortium will not intend to upload copies of the same data in order to avoid the creation of multiple persistent identifiers and thus making references and citation difficult.

3 FAIR data

3.1 Making data Findable

Each GrowBot dataset will be identified with a Digital Object Identifier (DOI) so that it can be findable and easily citable.

GrowBot consortium has chosen Zenodo as repository for the storage of the datasets. Zenodo provides DOI to all publicly available uploads. In particular, the DOI versioning allows users to update the datasets and maintain a right citing of the dataset.

Zenodo adopts a linear versioning rule[11], whereas GrowBot data versioning will follow the "Major.Minor numbering" rule (e.g. v2.1). An increase of the number before the period (Major) indicates a substantial change in the structure and/or content of the dataset. An increase of the number after the period (Minor) indicates a minimal revision, namely a quality improvement over existing version. During the project life, dataset will be characterized by mainly minor revisions, although major revisions will be possible beyond the end of GrowBot.

The consortium has defined a naming convention for the project datasets, namely:

1) A prefix "GrowBot"
2) "DATA" (short for dataset) followed by a unique chronological number of the project datasets
3) Letter indicating sub-dataset (if applicable)
4) The short title of the dataset
5) Version number

For instance, the first project dataset identified in Annex 2 will be named: "GrowBot_DATA1_**Error! eference source not found.**_v1.0"

To increase the findability of each dataset and consequent use, search keywords will be provided once the dataset is uploaded to Zenodo.

Each project records will be annotated with metadata in order to increase data reuse.

Zenodo follows the JSON metadata schema[12] and Data Cite metadata standards and already provides key data documentation such as:

- Creators and their affiliation
- Data location and persistent identifier
- Chosen license
- Funding
- Related/alternate identifiers

[11] https://blogs.openaire.eu/?p=2010
[12] https://zenodo.org/schemas/records/record-v1.0.0.json

- Contributors
- References
- Related journals, conferences, books and/or thesis
- Subjects

Moreover, the consortium will provide documentation as complete as possible to allow third parties to properly understand the data and eventually replicate the experiments. This will include:

- **Dataset overview** – number of sub-datasets; status of documented data (complete or in progress); eventual plan of the future update
- **Methodological information** – methods used for experimental design, data collection and data processing; instruments and software used; experimental conditions; quality assurance procedures performed on data
- **Software and tools information** – Name of tool/software; reference version; reference URL; optional DOI.

3.2 Making data openly Accessible

As a general rule, datasets will not be released before the publication date of the scientific paper, patents, reports, etc. in which the data are reported the first time. It is the intention of the GrowBot consortium to make the datasets publicly available as early as possible after the publication date. Potential restrictions or embargo periods of the scientific journal will have to be respected in accordance with what set out in Grant Agreement (art 29.2).

In accordance with what just claimed about the Intellectual Property Right IPR & Exploitation, GrowBot consortium has planned different levels of data confidentiality:

- *Beneficiary institution access*: The data are not disclosed at all. The partner that chooses this option believes that the dataset contains information that would lose their value if disclosed. This choice aims at protecting the information from any external access in order to exploit data for patents, publications, etc. The confidentiality must be ensured beyond the clauses agreed in the Consortium Agreement.
- *Confidential to the consortium (including EC services and GrowBot Advisory Board):* This option is applied for data containing confidential information (e.g. exploitable results) requiring IP protection, aimed at eventual exploitation. Confidential to consortium datasets will be deposited on specific repositories (private area of project website www.growbot.eu). These repositories will be accessible uniquely by the Consortium members. In order to make the data sharing among partner as effective as possible, in addition to the private area of project website, a SharePoint platform has been set up to support the consortium's needs.
- *Open Access*: This option is applied when data have no IP restrictions and will be openly available and re-usable.

Although the embargoed or closed access option provided by Zenodo could be a valid option, the consortium agrees that research data linked to exploitable results will not be deposited to avoid compromising their protection or commercialisation prospects. As clearly specified on Zenodo security provisions, "closed access is not suitable for secret or confidential data" since these are "stored unencrypted and may be viewed by Zenodo operational staff"[13]. In this case, the consortium

[13] http://about.zenodo.org/infrastructure/

will store the data in the private area of the project website or institutional repository (if any) with a proper cybersecurity certificate.

Visibility and access to publicly shared datasets will be facilitated by Zenodo metadata and search facility as well as to the automatic link to both OpenAIRE[14] and project Cordis project page[15].

3.3 Making data Interoperable

The consortium will strive to collect and document the data in a standardized way to ensure that datasets can be correctly understood, interpreted, and re-used.

Documentation describing the main variables included in the datasets will be provided in order to support the interpretation and re-use.

Standard vocabulary will be used for all data types present in the dataset to allow inter-disciplinary interoperability. In addition, the documentation will include a general glossary used to share information about the vocabulary and general methodologies employed for the generation of the dataset.

3.4 Increase data Re-use

In order to clarify the possibility to re-use GrowBot data, the consortium will provide a specific license for each deposited dataset that claims if the data have open or restricted access.

Zenodo automatically offers five different licensing options among Creative Commons Licenses, all foreseeing the attribution requirement to appropriately credit the authors for the original creation (credit, link to license and changes indications).

When possible, the consortium proposed licence is **Creative Commons Attribution 4.0 International (CC BY 4.0)**[16] allowing third parties to share and adapt data with no restrictions as long as attribution is provided.

In case the partner would like to further limit access to the uploaded data, alternative licenses will be selected also through the CC license chooser among the Zenodo offered options:

- **Creative Commons Attribution Share-Alike 4.0 International (CC BY-SA 4.0)**[17] – allowing adaptation for any purpose to the work to be shared as long as it is distributed under the same original licence (or a license listed as compatible);
- **Creative Commons Attribution-NoDerivatives 4.0 International (CC BY-ND 4.0)**[18] – allowing sharing for any purpose, but forbidding the distribution of derivative work;
- **Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0)**[19] – allowing sharing and adaptation to the work, but limiting the use of the shared work to non-commercial purposes;
- **Creative Commons Attribution-NonCommercial- NoDerivatives 4.0 International (CC BY-NC-ND 4.0)**[20] – allowing sharing but restricting both derivative work and commercial use of data.

[14] https://www.openaire.eu/search/project?projectId=corda__h2020::79742598f5e4d341bbfd1ca0c1d1d386
[15] http://cordis.europa.eu/project/rcn/206342_en.html
[16] https://creativecommons.org/licenses/by/4.0/
[17] https://creativecommons.org/licenses/by-sa/4.0/
[18] https://creativecommons.org/licenses/by-nd/4.0/
[19] https://creativecommons.org/licenses/by-nc/4.0/
[20] https://creativecommons.org/licenses/by-nc-nd/4.0/

Although not directly provided through Zenodo, an additional Creative Commons Attribution license can be applied upon specific request to Zenodo team:

- **Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)**[21] – allowing adaptation to the work to be shared as long as it is distributed for non-commercial purposes and under the same original licence (or a license listed as compatible).

All data will be stored in Zenodo as soon as possible, at the latest upon publication of the related scientific publication and will remain re-usable for the lifetime of the repository, which is currently warrantied for a minimum of 20 years.

4 Specific software provisions

Generally, the consortium agrees to provide full software and tools information for all dataset within the documentation. Information on tools name, version, URL and DOI will be thence added to increase dataset accessibility and re-usability.

Software plays a key role in GrowBot and particular provisions should thence be considered for software developed as part of the project activities in addition to provisions for access and rights agreed by partners in the GrowBot Consortium Agreement (Art 9.8, §1).

The partner(s) involved in software development will evaluate the possibility to upload the code on GitHub directly linked to Zenodo platform, as indicated in Annex A3.2.

5 Allocation of resources

At this preliminary stage of the project, the only costs foreseen for data management are related to:

- the working time needed to set up and perform the data collection, including synchronisation of devices, and analysis activities
- the working time to setup local and shared data collection devices/servers
- the working time needed to write documentation, metadata, etc.

The project coordinator is in charge of the DMP from both the scientific and technical perspective. IIT role include the first version release as well as the regular update.

Validation and registration of datasets and metadata, as well as backing up data for sharing through open access repositories is the responsibility of the partner that generates the data in the WP. Each partner will identify a specific responsible person for each dataset. Quality control of these data is the responsibility of the relevant WP leader, supported by the Project Coordinator. Each partner should respect the policies set out in this DMP.

Finally, in line with Grant Agreement (art 29.1) and Consortium Agreement (art 8.4.2.1), a beneficiary that intends to disseminate its results must give advance notice to the other beneficiaries of — unless agreed otherwise — at least 45 days, together with sufficient information on the results it will disseminate. Any other beneficiary may object within — unless agreed otherwise — 30 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the dissemination may not take place unless appropriate steps are taken to safeguard these legitimate interests.

[21] https://creativecommons.org/licenses/by-nc-sa/4.0/

6 Data security

As previously stated, each partner is in charge of backing up data that will be openly shared through Zenodo.

Once uploaded on Zenodo, data will also be stored in CERN Data Centre in multiple online independent replicas. Long-term preservation is guaranteed even in the unlikely event that Zenodo will cease operations, migration of content on other repositories is planned.

For the data that cannot be uploaded on Zenodo, because not publicly shareable; each institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy.

Annex 1. Keywords definitions

Keyword	Definition
Anonymised data	Data rendered anonymous in such a way that the data subject is no longer identifiable
Data Management Plan (DMP)	A document outlining how the research data collected or generated by a research project in Horizon 2020 will be handled during and after project end. It describes what data will be collected / generated, what methodology and standards are used, whether and how this data will be shared and/or made open, and how it will be curated and preserved.
Digital Object Identifier (DOI)	A persistent identifier used to uniquely identify objects, standardised by the International Standard Organisation.
License	Legal conditions under which an item or piece of knowledge being transferred is provided
Metadata	Information about the research data, structured information explaining the purpose, origin, time references, geographic location, creator, access conditions and terms of use of a data collection.
Open Access (OA)	The practice of providing on-line access to scientific information that is free of charge to the reader. In the context of Research and Innovation, open access typically focuses on access to 'scientific information', which refers to two main categories: peer-reviewed scientific research articles (published in academic journals) and scientific research data (data underlying publications and/or raw data).
Open Access to research data	The practice of providing access and the possibility to re-use digital research data. In a research context, examples of data include statistics, results of experiments, measurements, observations resulting from fieldwork, survey results, interview recordings, and images. Openly accessible research data can typically be accessed, mined, exploited, reproduced and disseminated free of charge for the user.
Open research data	Openly accessible research data can typically be accessed, mined, exploited, reproduced and disseminated, free of charge for the user.
Personal data	Any information relating to a natural person who is either identified or who could be identifiable by that data (e.g., by reference to an identifier such as a name, an identification number, location data, online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that person).
Repository	Digital archives collecting, preserving and displaying datasets, related documentation and metadata.
Research data	Research data refer to information, in particular facts or numbers, collected to be examined and considered as a basis for reasoning, discussion or calculation.
Zenodo	Research data repository created by CERN through the OpenAIRE project to provide a place for researchers to deposit datasets.

Annex 2. Project datasets

DS1 Biomechanical characterization of selected climbing plants

Dataset name **Biomechanical characterization of selected climbing plants**	*Type of Access* **GrowBot consortium only**	*Format* **.pdf .csv .xls/.xlsx .mp4 .txt .tiff .jpeg .png**
Creator **Thomas Speck and Nicholas Rowe**	*Curator* **Marc Thielen** and Frederike Klimm	*Partner Institution* **ALU-FR, CNRS, IIT-CMBR**
Description **Experimental data and imaging/video production related to the biomechanical characterization of selected biological models.**		
Restrictions on Sharing **Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.**		
Ethical issue management **No ethical concern**		
Copyright **By University of Freiburg, Centre National de la Recherche Scientifique, and Istituto Italiano di Tecnologia**		

Additional Information

- **Acquisition or processing based on:** Handwritten notes, digital measurements, imaging/video/sensor recordings acquired by researchers during experiments.
- **Quality assurance based on:** Before the acquisition, a calibration is performed (if required). The trials are repeated at least 5 times in the same experimental conditions. Data are verified after acquisition, and outliers, out-of-range data and any result of miscalibrated experiments are rejected (in accordance to statistical standards and good scientific practice).
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

DS2 Bioinspired robot control

Dataset name **Bioinspired robot control**	*Type of Access* **GrowBot consortium only**	*Format* **.pdf .csv .txt .xls/.xlsx .mat**
Creator **Yasmine Meroz and Cecilia Laschi**	*Curator* **Yasmin Ansari**	*Partner Institution* **TAU, SSSA, IIT-CMBR, CNRS, ALU-FR, GSSI**
Description **Modelling of plant behaviors and development of control architecture for robots.**		
Restrictions on Sharing **Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.**		
Ethical issue management **No ethical concern**		
Copyright **By University of Tel Aviv, Scuola Superiore di Studi Universitari e di Perfezionamento Sant'Anna, Istituto Italiano di Tecnologia, Centre National de la Recherche Scientifique, University of Freiburg, and Gran Sasso Science Institute**		

Additional Information

- **Acquisition or processing based on:** Digital measurements, imaging/video/sensor recordings acquired by researchers during experiments.
- **Quality assurance based on:** Before the acquisition, a calibration is performed (if required). The trials are repeated at least 5 times in the same experimental conditions. The data is verified after the acquisition and wrong data is discarded.
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

DS3 Networking information model

Dataset name **Networking information model**	*Type of Access* **GrowBot consortium only**	*Format* **.pdf .csv .txt .xls/.xlsx .mat**
Creator **Pierangelo Marcati**	*Curator* **Michele Palladino**	*Partner Institution* **GSSI**
Description **Modelling of information management in plants.**		
Restrictions on Sharing **Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.**		
Ethical issue management **No ethical concern**		
Copyright **By Gran Sasso Science Institute**		

Additional Information

- **Acquisition or processing based on:** GSSI researchers will not foresee to acquire digital measurements and imaging/video/sensor recordings.
- **Quality assurance based on:** If GSSI researchers will manage data, data will be verified after the acquisition, outliers and out-of-range data will be rejected.
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

DS4 Microfabricated spinner of responsive materials with attachment capabilities

Dataset name	*Type of Access*	*Format*
Microfabricated spinner of responsive materials with attachment capabilities	**GrowBot consortium only**	**.pdf .csv .txt .xls/.xlsx .mat**
Creator	*Curator*	*Partner Institution*
Stefano Linari and Nicola Tirelli	**Mike Geven**	**Linari, IIT-POLBIOM, HZG**
Description		
Development of a microfabricated spinner able to deposit materials responsive to (bio)chemical stimuli and perform attachment on external structures.		
Restrictions on Sharing		
Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.		
Ethical issue management		
No ethical concern		
Copyright		
By Linari, Istituto Italiano di Tecnologia, and Helmholtz-Zentrum Geesthacht		

Additional Information

- **Acquisition or processing based on:** Material characterization measurements in digital format, imaging/video/sensor recordings acquired by researchers during experiments.
- **Quality assurance based on:** Material characterization experiments are repeated at least 3 times under the same experimental conditions, other experiments up to 5 times. The data/signals are verified during acquisition and an internal check is performed by the means of appropriate calibrations (typically, positive and negative controls, and standards for the signal linearization). Outliers, out-of-range data and any result of miscalibrated experiments are rejected.
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

DS5 Multi-filament deposition mechanism

Dataset name	*Type of Access*	*Format*
Multi-filament deposition mechanism	**GrowBot consortium only**	**.pdf .csv .txt .xls/.xlsx .mat**
Creator	*Curator*	*Partner Institution*
Barbara Mazzolai	**Francesca Tramacere**	**IIT-CMBR**
Description		
Development of a multi-material deposition mechanism.		
Restrictions on Sharing		
Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.		
Ethical issue management		
No ethical concern		
Copyright		
By Istituto Italiano di Tecnologia		

Additional Information

- **Acquisition or processing based on:** Digital measurements, imaging/video/sensor recordings acquired by researchers during experiments.
- **Quality assurance based on:** Before the acquisition, a calibration is performed (if required). The trials are repeated at least 5 times in the same experimental conditions. Data are verified after acquisition, and outliers, out-of-range data and any result of miscalibrated experiments are rejected.
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

DS6 Micro-extrusion prototype and foaming

Dataset name	*Type of Access*	*Format*
Micro-extrusion prototype and foaming	**GrowBot consortium only**	**.pdf .csv .txt .xls/.xlsx .mat**
Creator	*Curator*	*Partner Institution*
Andreas Lendlein and Nicola Tirelli	**Marc Behl**	**HZG, IIT-POLBIOM**

Description

Development of a micro-extrusion prototype for *in-situ* fabrication and design of actuator and growth material based on foaming.

Restrictions on Sharing

Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.

Ethical issue management

No ethical concern

Copyright

By Helmholtz-Zentrum Geesthacht and Istituto Italiano di Tecnologia

Additional Information

- **Acquisition or processing based on:** Digital measurements, imaging/video/sensor recordings acquired by researchers during experiments.
- **Quality assurance based on:** Before the acquisition, a calibration is performed (if required). Depending on the experiment design, the trials are repeated at least 3 times in the same experimental conditions, when applicable a higher number of repeats will be conducted. Data are verified after acquisition, and outliers, out-of-range data and any result of miscalibrated experiments are rejected.
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

DS7 Soft "searcher-like" robot

Dataset name	*Type of Access*	*Format*
Soft "searcher-like" robot	**GrowBot consortium only**	**.pdf .csv .txt .xls/.xlsx .mat**
Creator	*Curator*	*Partner Institution*
Barbara Mazzolai	**Francesca Tramacere**	**IIT-CMBR, SSSA**

Description
Development of a robotic searcher tip with sensing and actuation abilities.

Restrictions on Sharing
Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.

Ethical issue management
No ethical concern

Copyright
By Istituto Italiano di Tecnologia and Scuola Superiore di Studi Universitari e di Perfezionamento Sant'Anna

Additional Information

- **Acquisition or processing based on:** Digital measurements, imaging/video/sensor recordings acquired by researchers during experiments.
- **Quality assurance based on:** Before the acquisition, a calibration is performed (if required). The trials are repeated at least 5 times in the same experimental conditions. Data are verified after acquisition, and outliers, out-of-range data and any result of miscalibrated experiments are rejected.
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

DS8 Microbial fuel cells (MFCs)

Dataset name **Microbial fuel cells (MFCs)**	*Type of Access* **GrowBot consortium only**	*Format* **.pdf .csv .txt .xls/.xlsx .mat**
Creator **Pablo Vidarte**	*Curator* **Marc Segalés**	*Partner Institution* **Bioo**
Description **Microbial fuel cells (MFCs) for topsoil energy harvesting.**		
Restrictions on Sharing **Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.**		
Ethical issue management **No ethical concern**		
Copyright **By Bioo**		

Additional Information

- **Acquisition or processing based on:** Digital measurements, imaging/video/sensor recordings acquired by researchers during experiments.
- **Quality assurance based on:** Before the acquisition, a calibration is performed (if required). The trials are repeated at least 3 times in the same experimental conditions. Data are verified after acquisition, and outliers, out-of-range data and any result of miscalibrated experiments are rejected.
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

DS9 Plant-robot interfaces for energy harvesting

Dataset name **Plant-robot interfaces for energy harvesting**	*Type of Access* **GrowBot consortium only**	*Format* **.pdf .csv .txt .xls/.xlsx .mat**
Creator **Barbara Mazzolai**	*Curator* **Fabian Meder**	*Partner Institution* **IIT-CMBR**
Description **Development of structures that generate energy from environmental mechanical stimuli.**		
Restrictions on Sharing **Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.**		
Ethical issue management **No ethical concern**		
Copyright **By Istituto Italiano di Tecnologia**		

Additional Information

- **Acquisition or processing based on:** Digital measurements, imaging/video/sensor recordings acquired by researchers during experiments.
- **Quality assurance based on:** Before the acquisition, a calibration is performed (if required). The trials are repeated at least 5 times in the same experimental conditions. Data are verified after acquisition, and outliers, out-of-range data and any result of miscalibrated experiments are rejected.
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

DS10 Robot integration

Dataset name **Robot integration**	*Type of Access* **GrowBot consortium only**	*Format* **.pdf .csv .txt .xls/.xlsx .mat**
Creator **Barbara Mazzolai**	*Curator* **Francesca Tramacere**	*Partner Institution* **IIT-CMBR, All**

Description

Integration of additive manufacturing mechanisms with developed or commercially available materials, together with software developed, as well as solutions for energy generation and harvesting.

Restrictions on Sharing

Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.

Ethical issue management

No ethical concern

Copyright

By Istituto Italiano di Tecnologia and all partners

Additional Information

- **Acquisition or processing based on:** Digital measurements, imaging/video/sensor recordings acquired by researchers during experiments.
- **Quality assurance based on:** Before the acquisition, a calibration is performed (if required). The trials are repeated at least 5 times in the same experimental conditions. Data are verified after acquisition, and outliers, out-of-range data and any result of miscalibrated experiments are rejected.
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

DS11 Robot validation

Dataset name **Robot validation**	*Type of Access* **GrowBot consortium only**	*Format* **.pdf .csv .txt .xls/.xlsx .mat**
Creator **Nicholas Rowe and Barbara Mazzolai**	*Curator* **Francesca Tramacere**	*Partner Institution* **CNRS, IIT, All**
Description **Experimental methodology and multi-stimulus experimental setup to validate robot performance and behavior.**		
Restrictions on Sharing **Strictly confidential until patent filed or publication accepted. Afterwards, the involved partners will evaluate the possibility to publish dataset as open access.**		
Ethical issue management **No ethical concern**		
Copyright **By Centre National de la Recherche Scientifique, Istituto Italiano di Tecnologia, and all partners**		

Additional Information

- **Acquisition or processing based on:** Digital measurements, imaging/video/sensor recordings acquired by researchers during experiments.
- **Quality assurance based on:** Before the acquisition, a calibration is performed (if required). The trials are repeated at least 5 times in the same experimental conditions. Data are verified after acquisition, and outliers, out-of-range data and any result of miscalibrated experiments are rejected.
- **Dataset is not openly accessible because:** Authors foresee publication on appropriate peer-reviewed journals.
- **Dataset is archived on:** Preliminary institutional ICT infrastructure guarantees preservation and safety of the stored data in compliance with its (Information Security) internal policy; afterwards the data publication, the dataset can be uploaded on Zenodo.
- **Dataset will be archived for:** Project duration + 5 years.

Annex 3. GrowBot guide for Zenodo upload & update

A3.1 Access to Zenodo

- Create your personal account here: https://zenodo.org/signup/
- Login to Zenodo: https://zenodo.org/login/
- Access GrowBot community:
  - Collection: https://zenodo.org/communities/growbot/
  - Upload page: https://zenodo.org/deposit/new?c=growbot

A3.2 Upload

Datasets include all data developed within the GrowBot project, whose access – in line with § 3.2 - is not Confidential to partner.

Publication includes all scientific publications (e.g. conference papers, journal articles, book sections) as well as project outputs (e.g. deliverables, milestones, report).

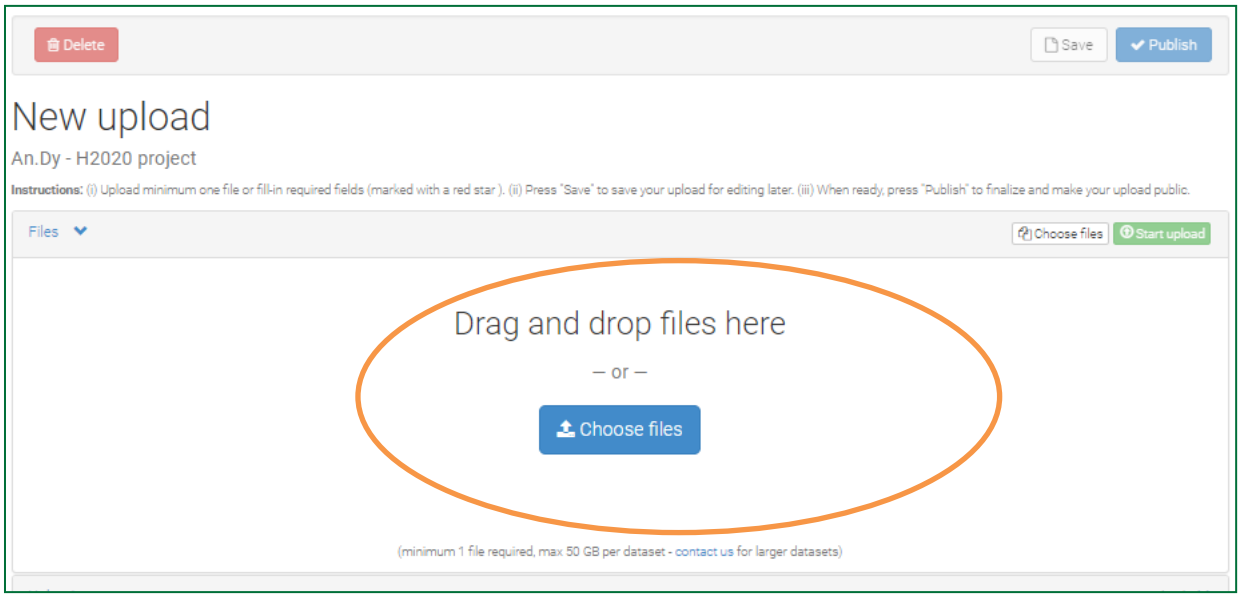
In this guide, the term "Record" refers to a new GrowBot upload, either Dataset, Publication, Software or other type of document.

A3.2.1 Datasets, publications & software

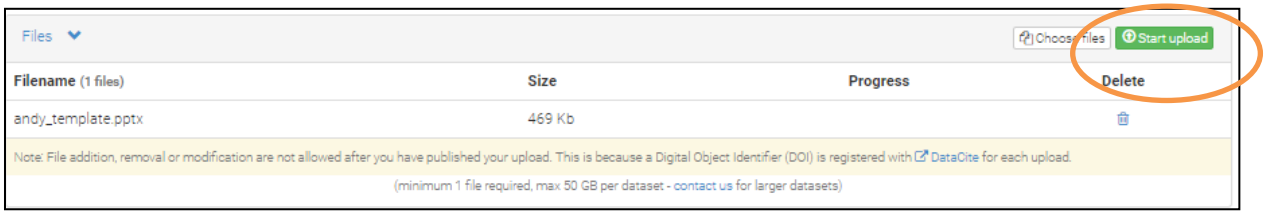
N.B: this guideline is applicable to software not publicly available on GitHub. In that case, please refer to §A3.2.2.

1. Open GrowBot community upload page (https://zenodo.org/deposit/new?c=growbot)
   This address will automatically ensure you to have your record added to GrowBot community collection

2. Drag and drop or upload your file(s) up to 50GB:

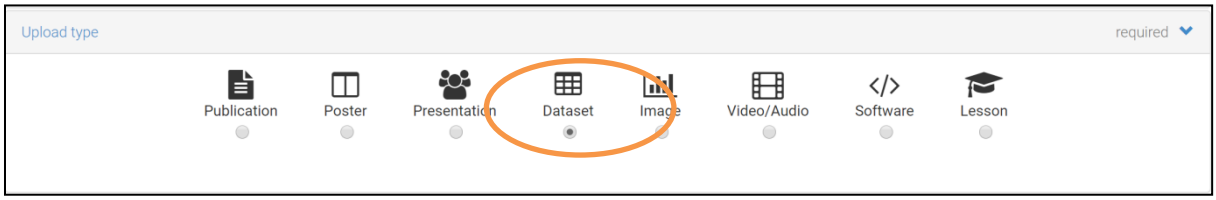


3. Once the file is recognised, start uploading it:



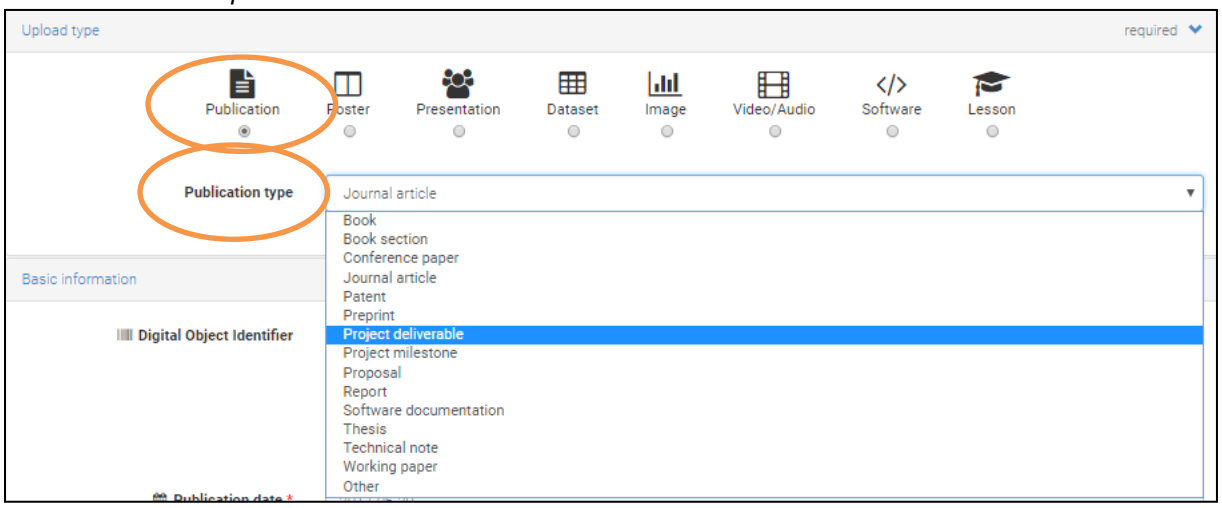
4. Select the Upload type

   a. **DATASETS:**



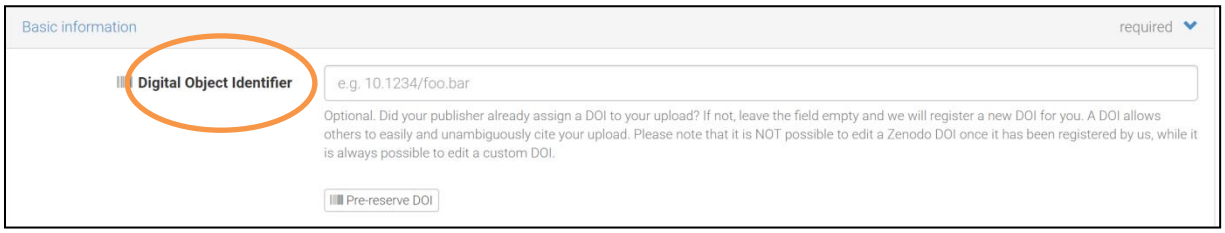
   b. **PUBLICATIONS:**

   Once the main upload type is selected, select the detailed Publication type from the dropdown menu.



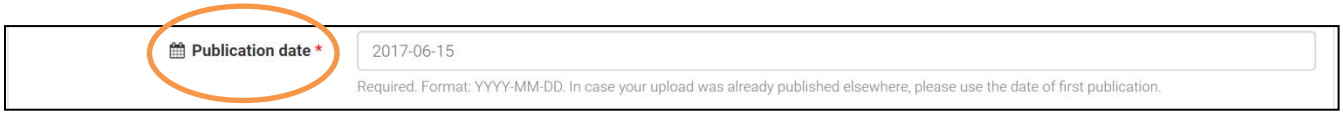
   c. **SOFTWARE:**

5. Insert Basic information:
    a. **DOI**:
        i. If the record already has a persistent identifier number, please insert it here.
        ii. If you do not have a DOI yet, please leave the field empty. A DOI will be automatically created once the record will be published on Zenodo

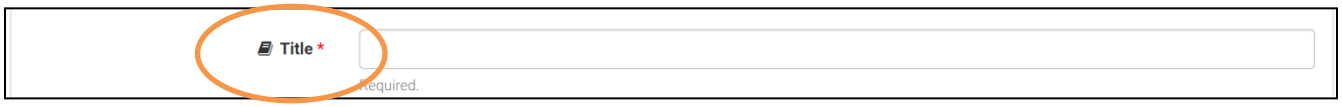


Please note that it is NOT possible to edit a Zenodo DOI (option ii) once it has been registered by us, while it is always possible to edit a custom DOI (option i).

    b. **Publication date**:
        i. If the record has been already published elsewhere, please indicate the exact publication date
        ii. Alternatively, a publication date will be automatically inserted once the record will be published on Zenodo

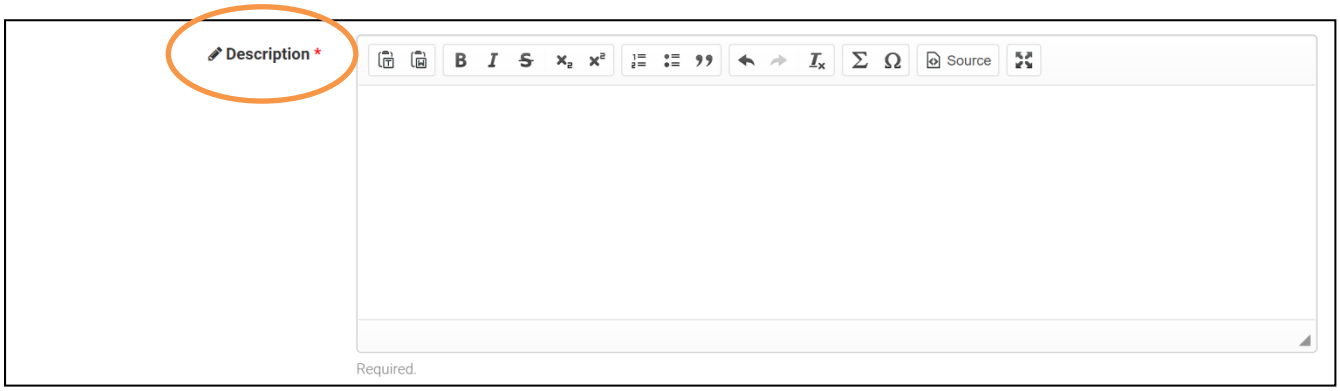


    c. **Title**: please insert your record title
        i. **DATASETS**: according to consortium naming system (§3.1)
        ii. **PUBLICATIONS:** official Publication title
        iii. **SOFTWARE:** official Software title, according to information included in Dataset documentation (§3.1/4)



    d. **Authors**: please indicate authors of the dataset. These names will be automatically included in the record metadata and citation indications.

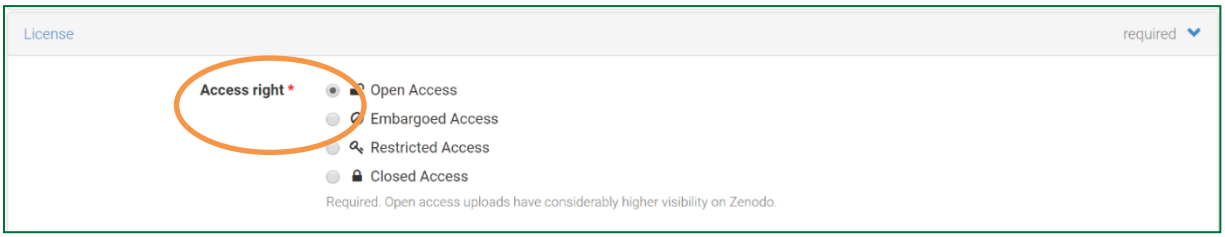
e. **Description**: please provide a short description of your record.
Please consider that this information will be shown for all record, regardless of the selected access. For closed or restricted dataset, no sensitive information should be included. Eventual key description can be added in a separate text file to be included in the dataset package



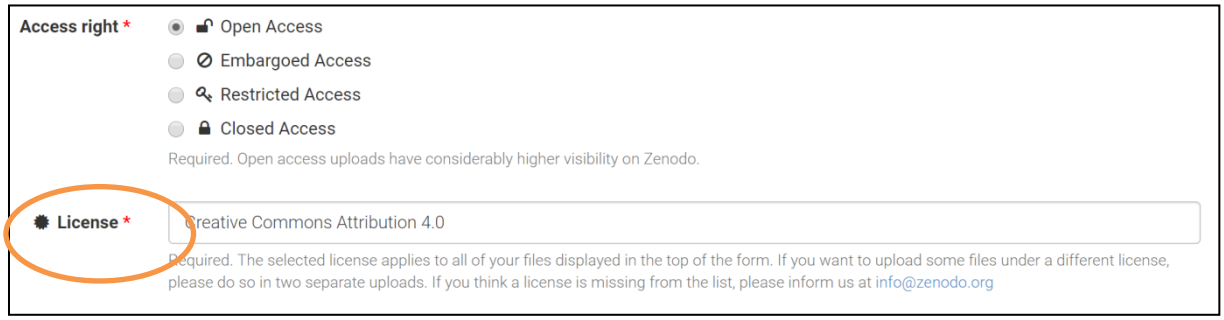
f. **Keywords**: Please include keywords helping to identify and find your record. Aside to technical keywords, the following keywords should always be included:
   i. Horizon 2020
   ii. GrowBot project
   iii. Research and Innovation Action

g. **Additional notes**: please include the following text for funding reference
   i. **Datasets**:
   "Dataset developed within the GrowBot project, funded by the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 824074"
   ii. **Publications:**
   "Publication developed within the GrowBot project, funded by the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 824074"
   iii. **Software:**
   "Software developed within the GrowBot project, funded by the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 824074"

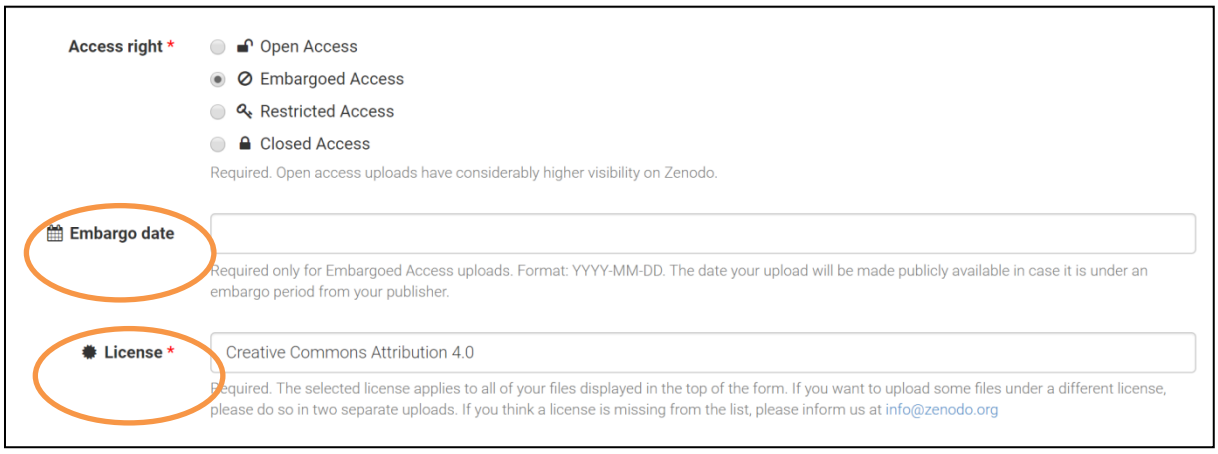
6. Please provide information on access:
   a. **Datasets and softwares**: refer to indications in DMP (§3.2)
   b. **Publications**:
      i. Scientific publication MUST be uploaded with either Open Access or Embargoed Access, depending on the agreement with the publisher.
      ii. Project deliverables access rights depend on the deliverable level of confidentiality
         - Public deliverable → Open Access
         - Confidential deliverable → Restricted Access



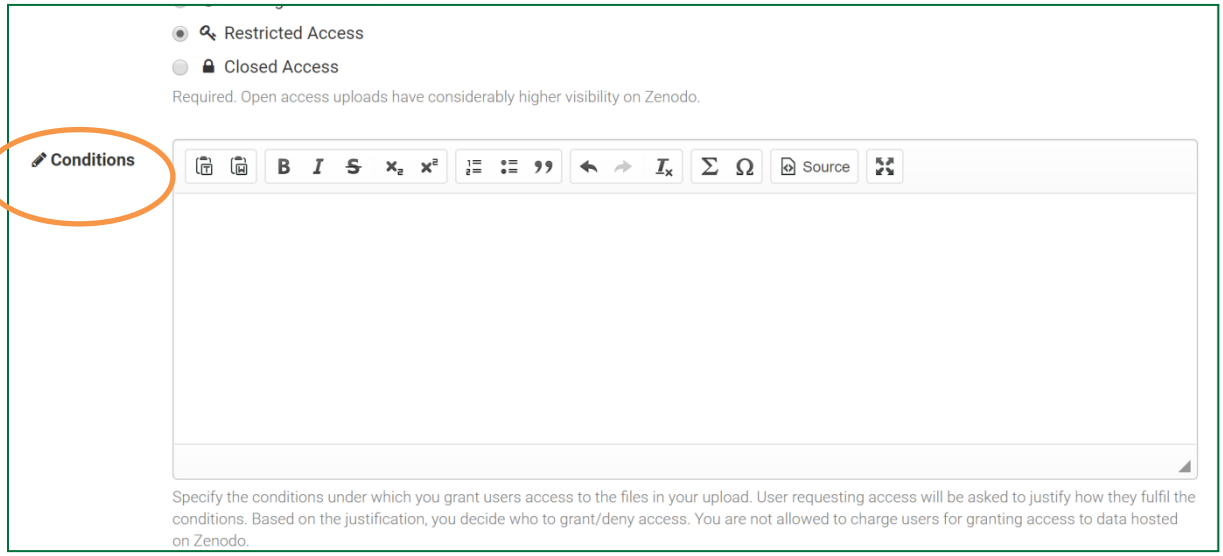
c. If **Open Access** is provided: please select appropriate license (see indications in §3.4)



d. If **Embargoed** Access is provided: please
   i. Indicate date of when the dataset will be made available (Embargo date)
   ii. select appropriate license (see indications in §3.4)



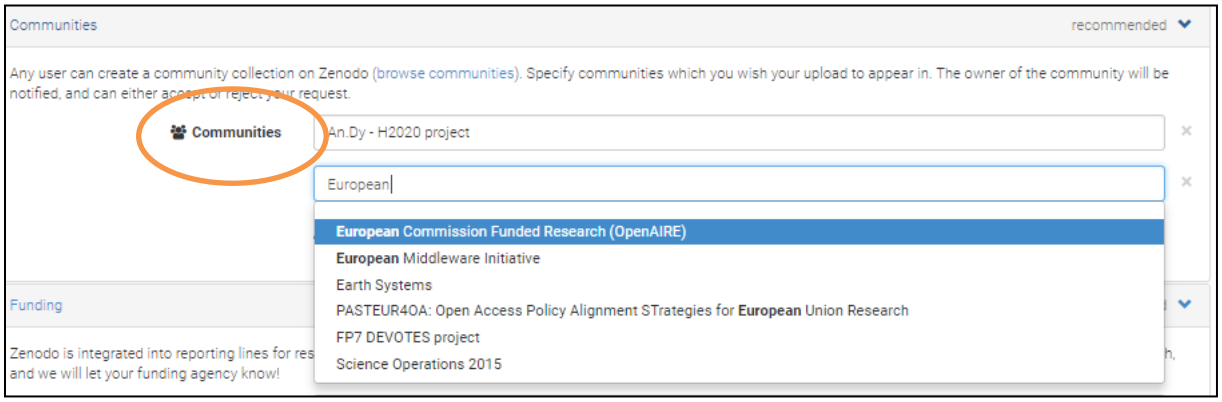
e. If **Restricted Access** is provided: Please specify conditions for access (e.g. "Limited to GrowBot Consortium")



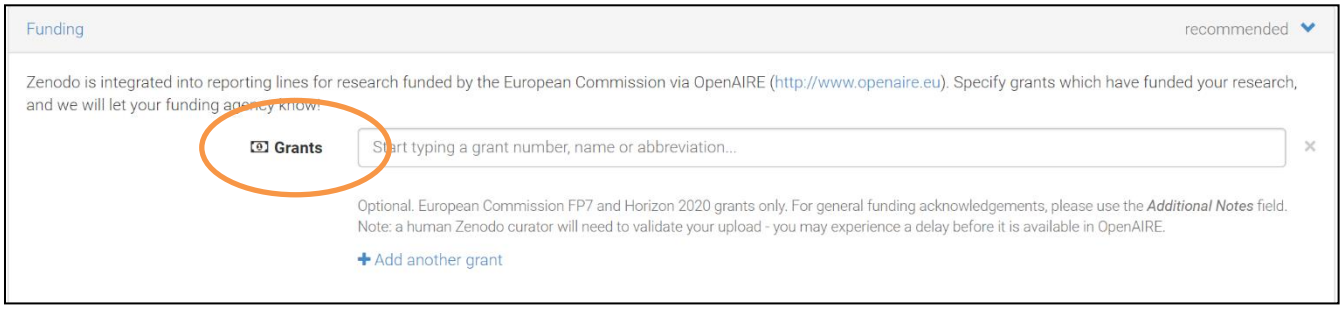
f. If **Closed Access** is provided, no additional information is required but please consider that only the person uploading the document can see and access the document.

7. Select the appropriate Zenodo Communities.
   a. **GrowBot project community**
      This will be automatically inserted if you upload via the project community. If you use the standard upload option of Zenodo, please select the appropriate community.
   b. **European Commission Funded Research (OpenAIRE)**

   A dropdown list will appear once the first letters are typed: please notice that the input is Case sensitive!



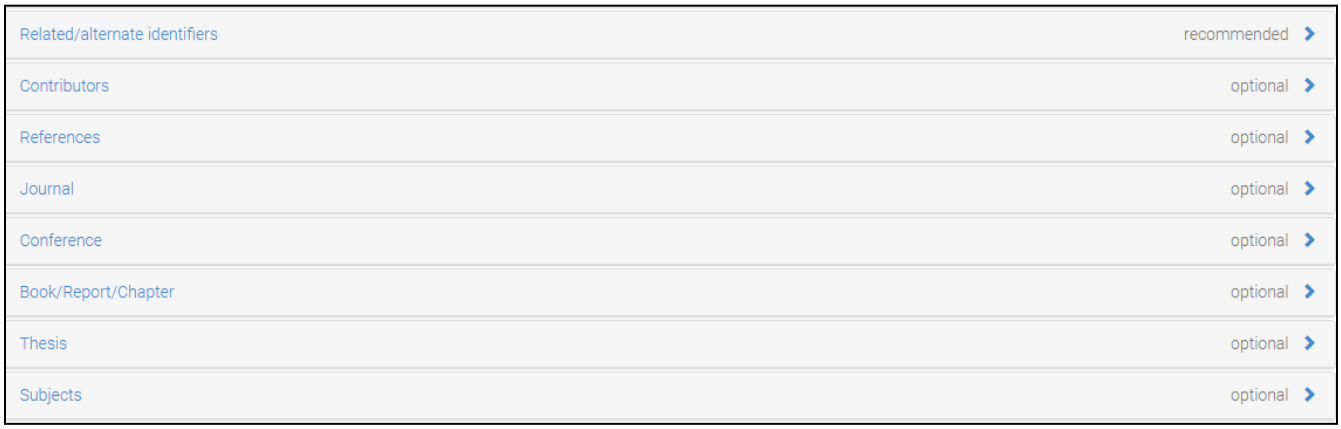
8. Select the GrowBot grant reference for **Funding** information: a dropdown menu will appear once you insert key reference to either
   a. project grant number (*824074*),
   b. acronym (*GrowBot*), or
   c. title (*Towards a new generation of plant-inspired growing artefacts*)



In case the record is the result of actions funded under different grants, you can add reference to several funding references.

9. Provide eventual **related information** on:
    a. Related/alternate identifiers
    b. Contributors
    c. References
    d. Journals
    e. Conferences
    f. Book/Report/Chapter
    g. Thesis
    h. Subjects

Please note: cross-reference to the related publication is mandatory for **datasets** underlying publication(s).

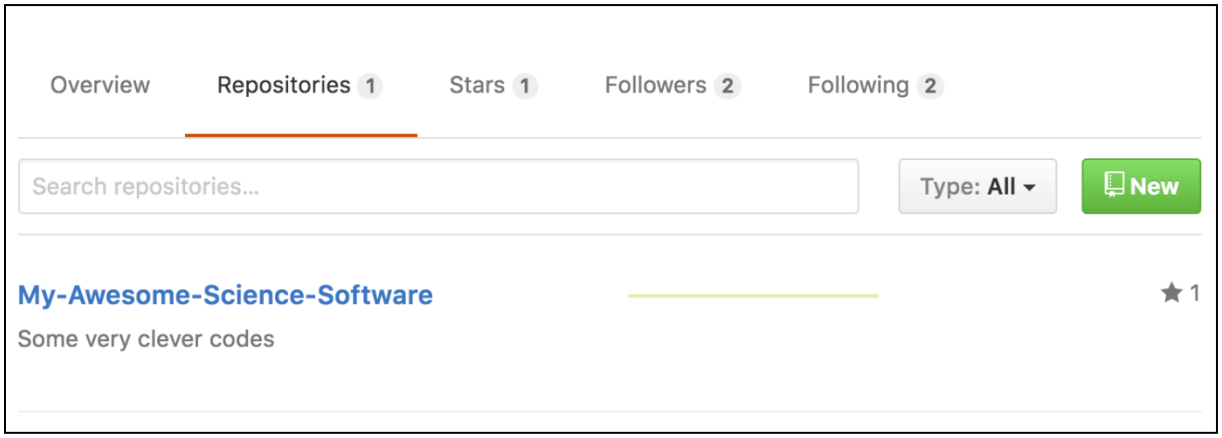


10. **Save and publish**
    - **Saving** is allowed several times either before or after publishing
    - **Publish** will make the dataset page visible on Zenodo to others (but the access to the files will depend on the access option selected in step 8).
    - **Delete** is possible only before publication.

A3.2.2 Software – GitHub integration[22]

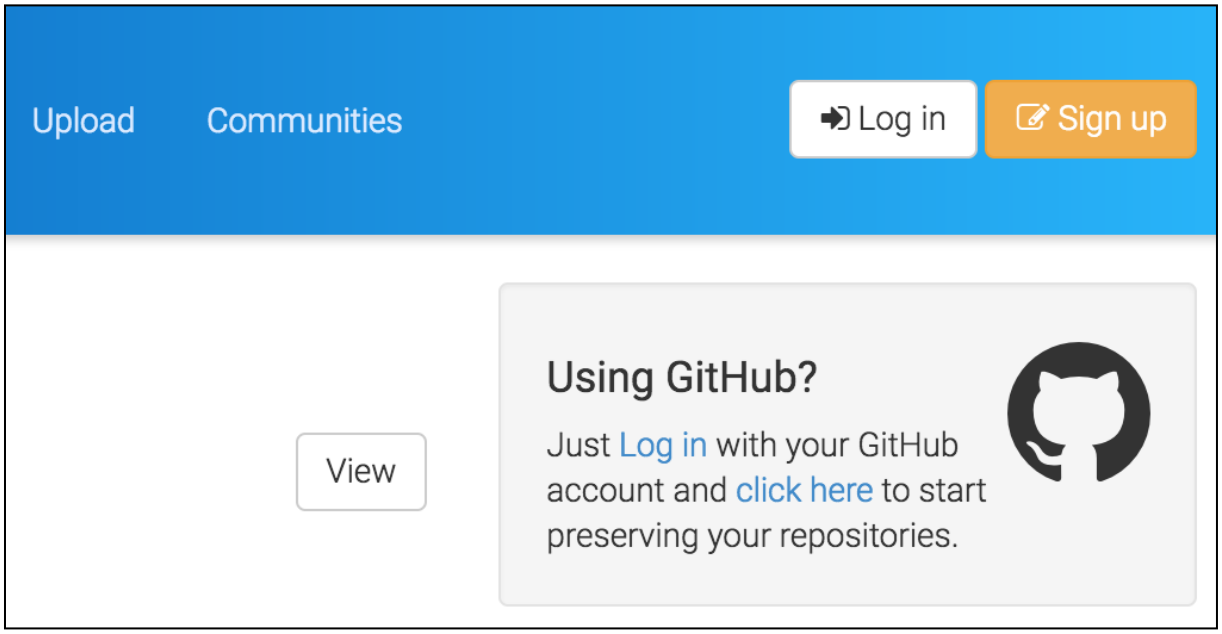
1. **Choose your GitHub repository**

   Head over to your GitHub profile and click the Repositories tab.



2. **Login to Zenodo**

   Head over to Zenodo and click the Log in button at the top right of the page, which gives you an option to login with your GitHub account.

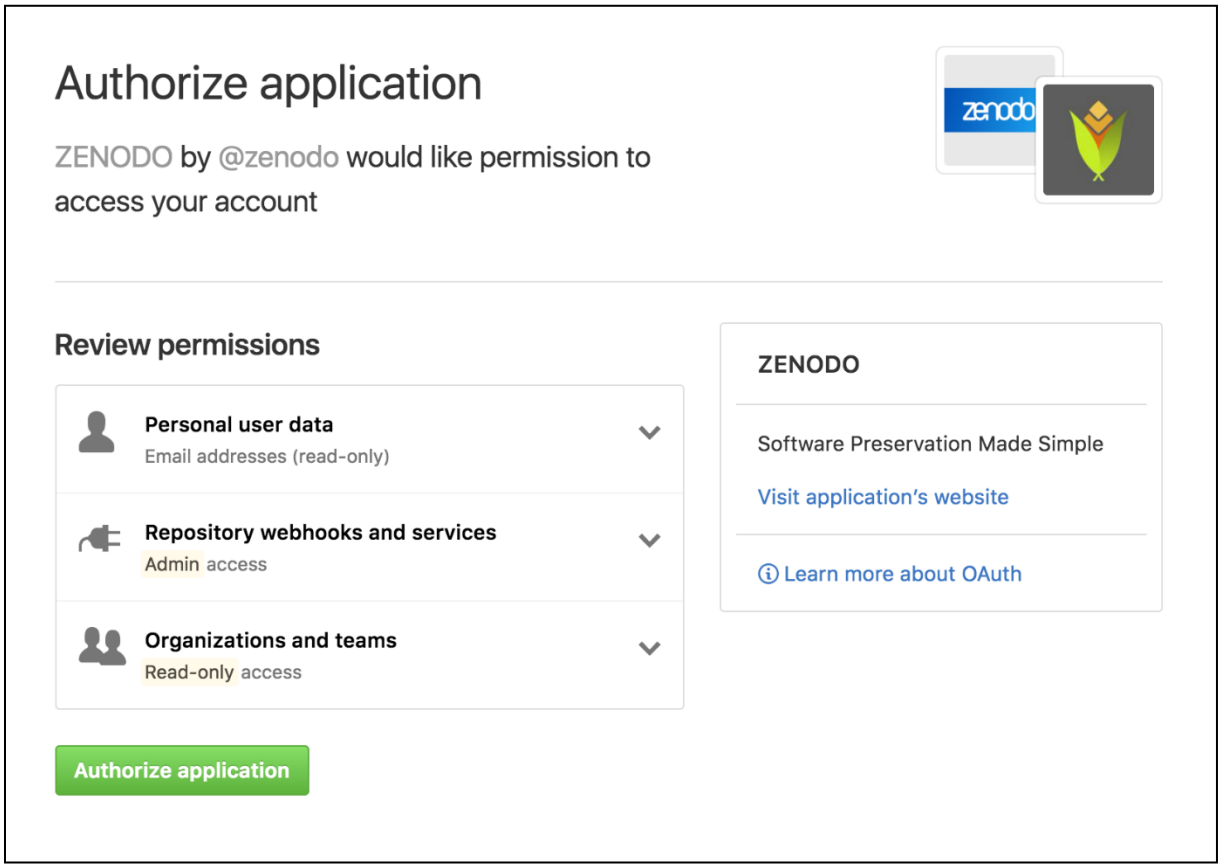


   Zenodo will redirect you back to GitHub to ask for your permission to share your email address and the ability to configure webhooks on your repositories.

[22] Original source: https://guides.github.com/activities/citable-code/

3. **Authorize application**
   Click **Authorize application** to give Zenodo the permissions it needs.

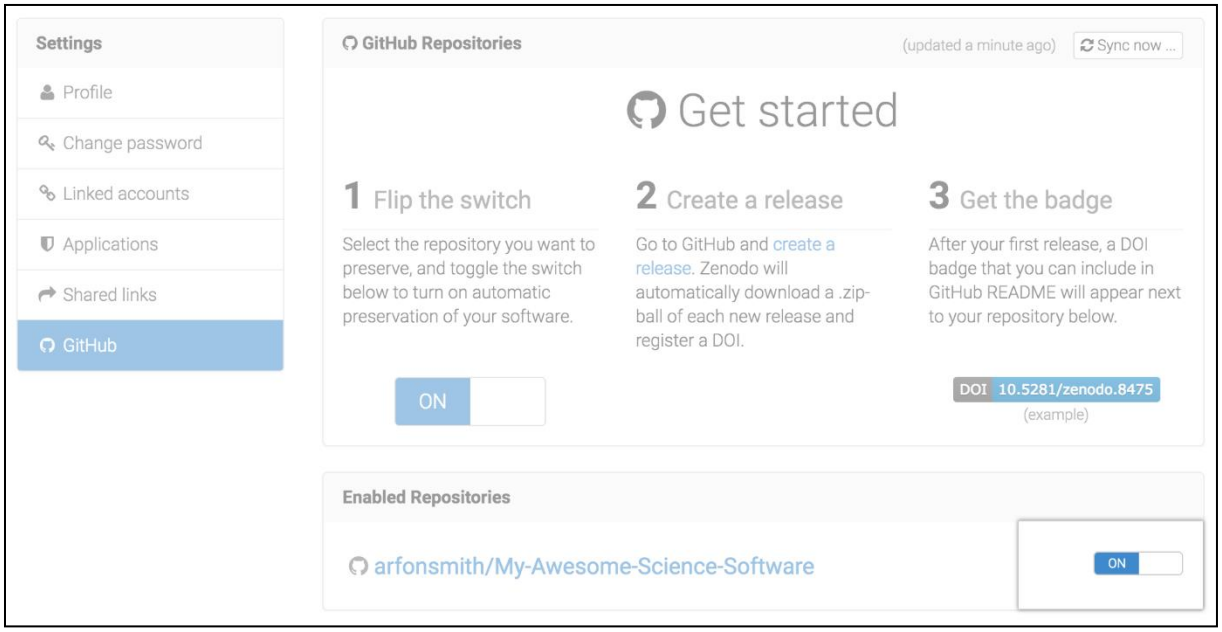
   Important! If you want to archive a repository that belongs to an organization on GitHub, you will need to make sure that the organization administrator has enabled third-party access to the Zenodo application.



4. **Pick the repository you want to archive**

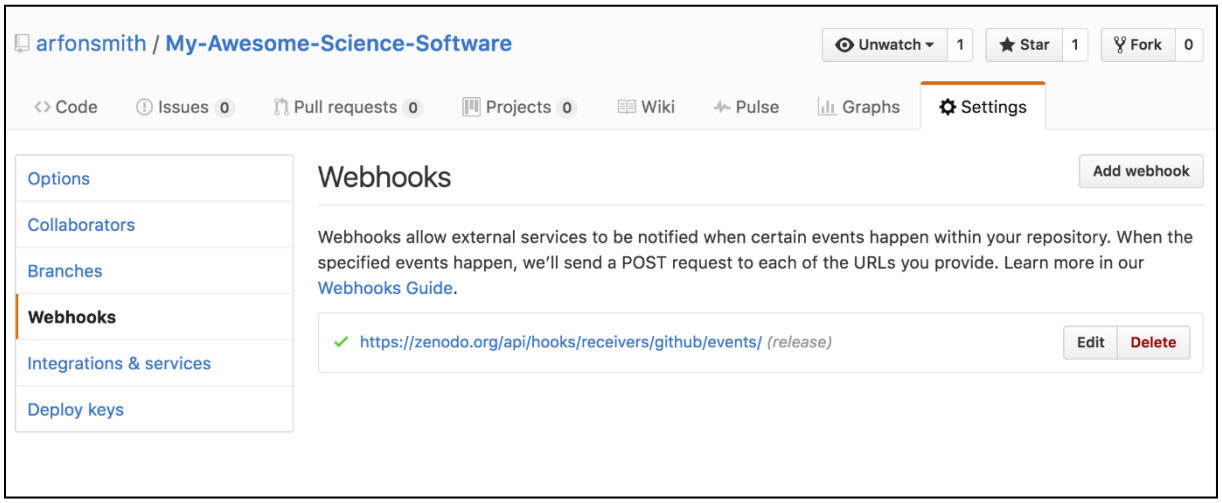
   At this point, you have authorized Zenodo to configure the repository webhooks needed to allow for archiving and DOI-issuing. To enable this functionality, simply click the **On** toggle button next to your repository (in this case **My-Awesome-Science-Software**).

   Important! Zenodo can only access your public repositories so make sure the repository you want to archive is public.



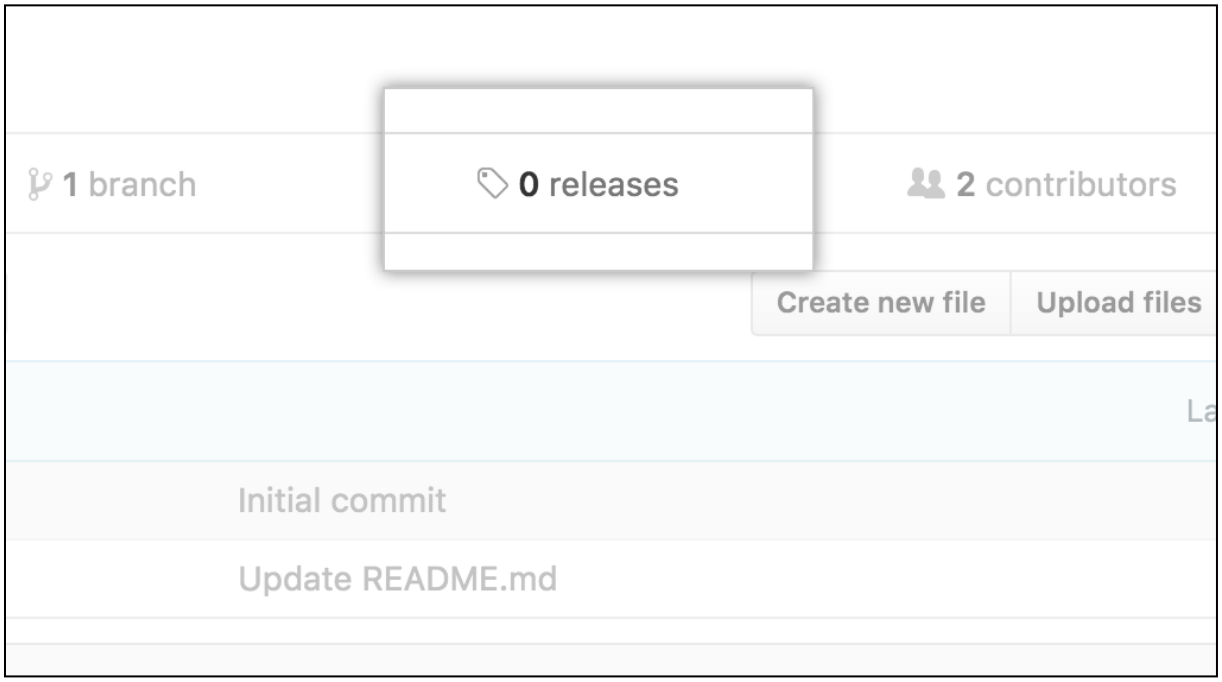
5. **Check repository settings**

   By enabling archiving in Zenodo, you have set up a new webhook on your repository. Click the settings tab on your repository, and then click 'Webhooks' in the left-hand menu. You should see something like the image below, which shows a new webhook configured to send messages to Zenodo.

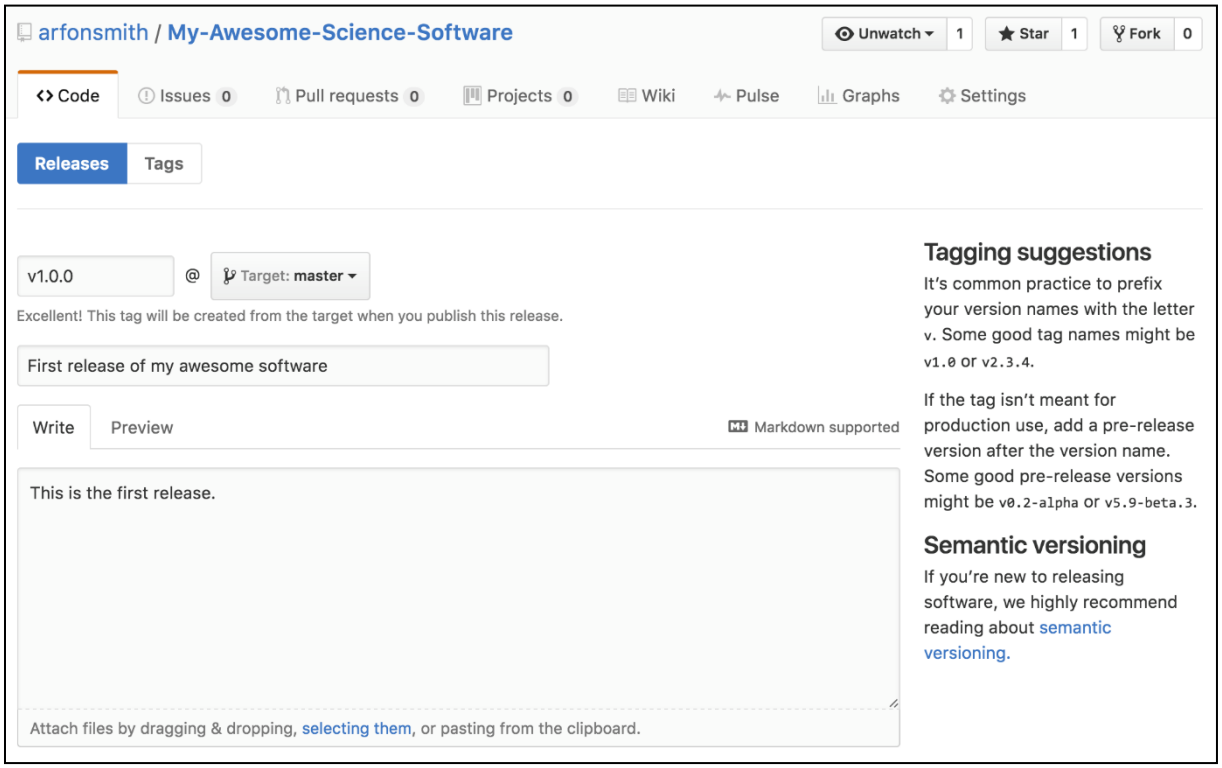


6. **Create a new release**

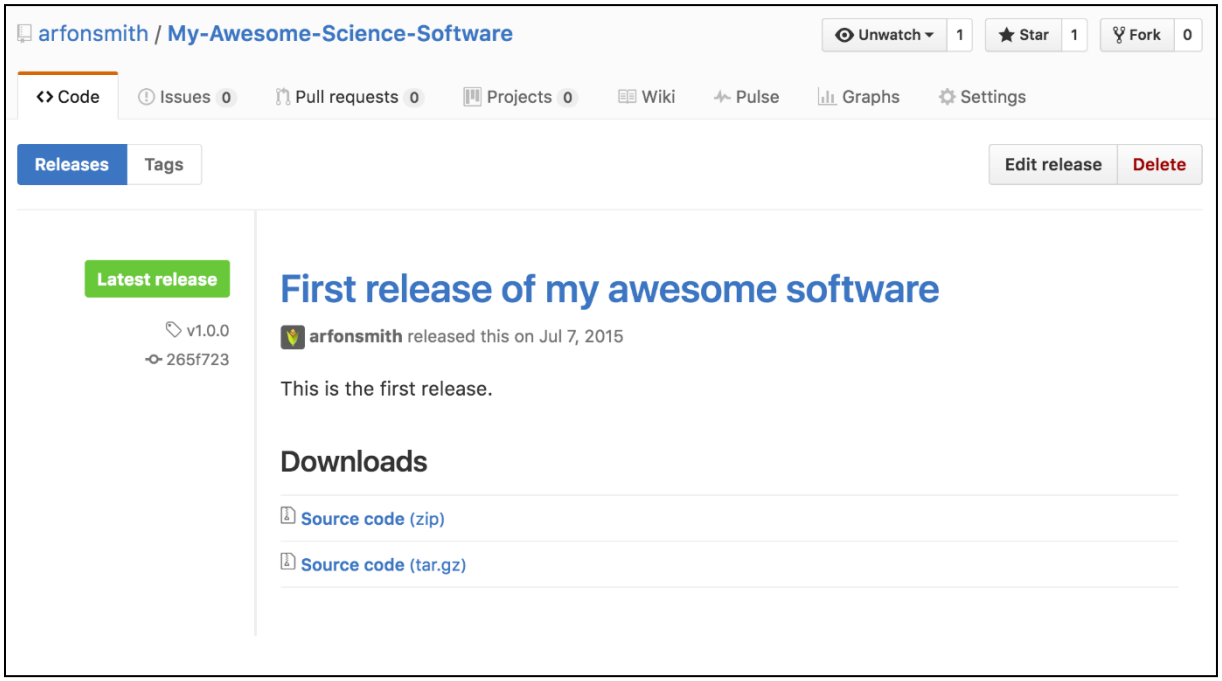
   By default, Zenodo takes an archive of your GitHub repository each time you create a new Release. To test this out, head back to the main repository view and click on the **releases** header item.



   Unless you have created releases for this repository before, you will be asked to **Create a new release**. Go ahead and click this button and fill in the new release form.

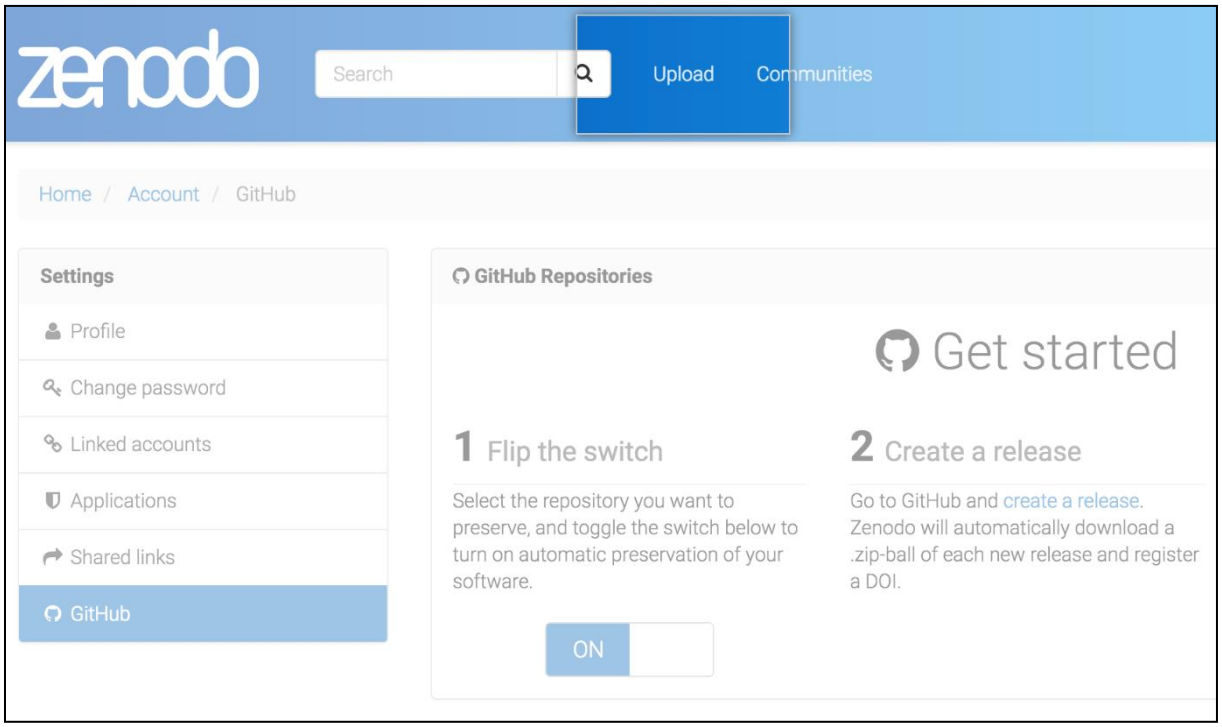


If this is the first release of your code then you should give it a version number of `v1.0.0`. Fill in any release notes and click the **Publish release** button.



7. **Checking everything has worked**

   Creating a new release will trigger Zenodo into archiving your repository. You can confirm that this process took place by click the **Upload** tab in your Zenodo profile. You should see a new upload in the right-hand panel.

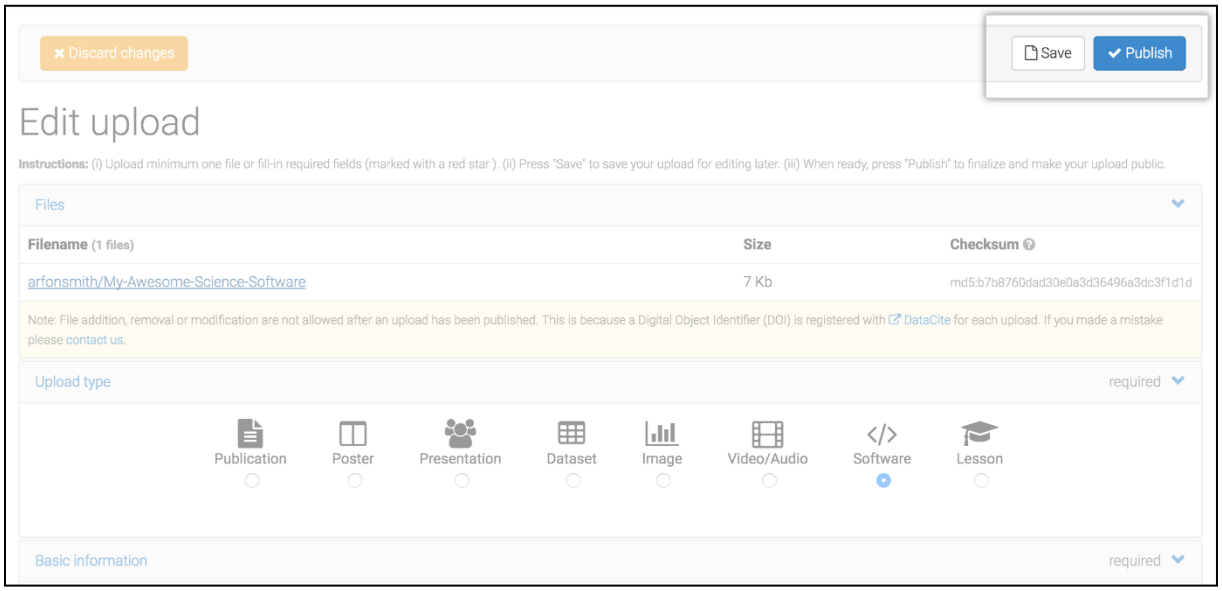


8. **Minting a DOI**

Before Zenodo can issue a DOI for your repository, you will need to provide some information about the GitHub repo that you have just archived.

For these, please refer to §A3.2.1Datasets, publications & software.

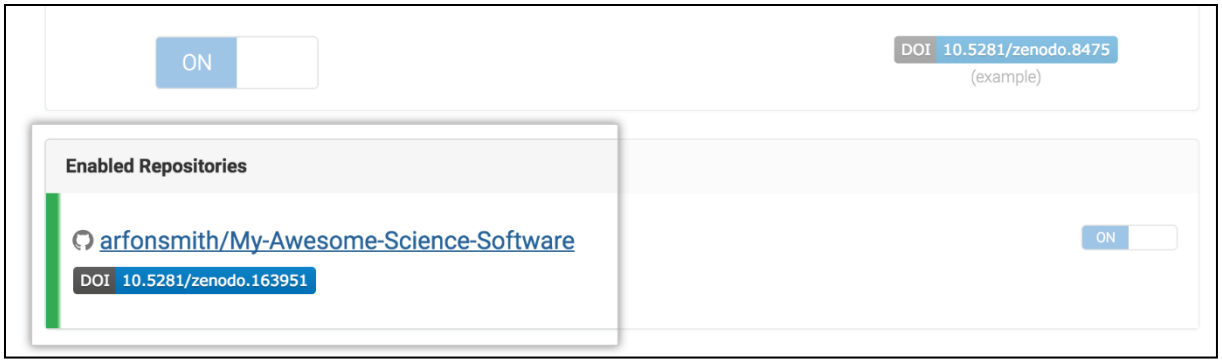
Once you are satisfied with the description of your software, click the **Publish** button at the bottom of the Zenodo form. This way you have just made a new DOI for your GitHub repository.



9. **Finishing up**

Back on your Zenodo GitHub page you should now see your repository listed with a shiny new badge showing your new DOI!

***ProTip**: If you really want to show off, then right click on the grey and blue DOI image and copy the URL and place it in your README on your GitHub repo.*

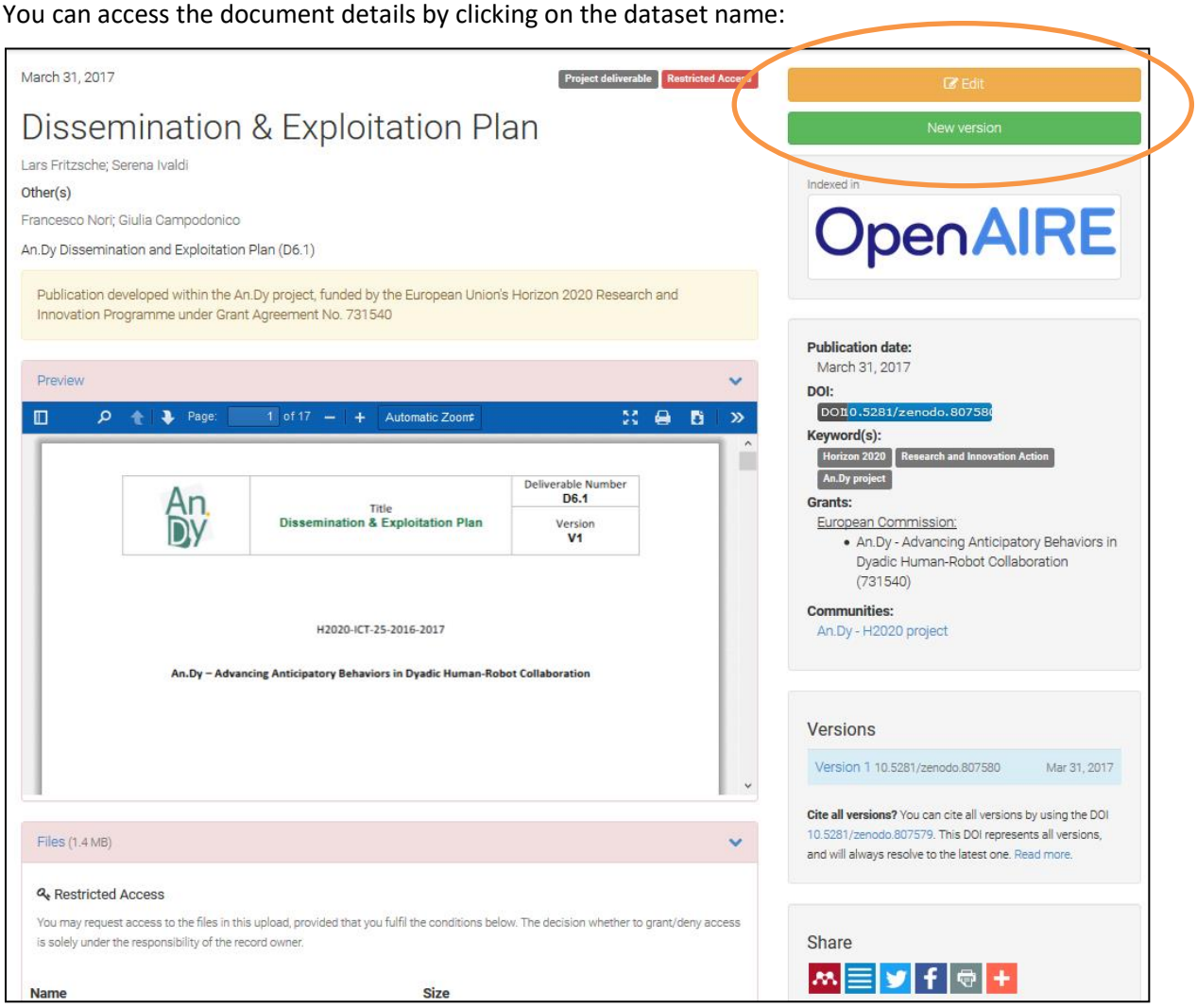


A3.3 Update

Once the record is saved or published, you can access it via the **Upload** option:

A list of all uploaded documents will appear:

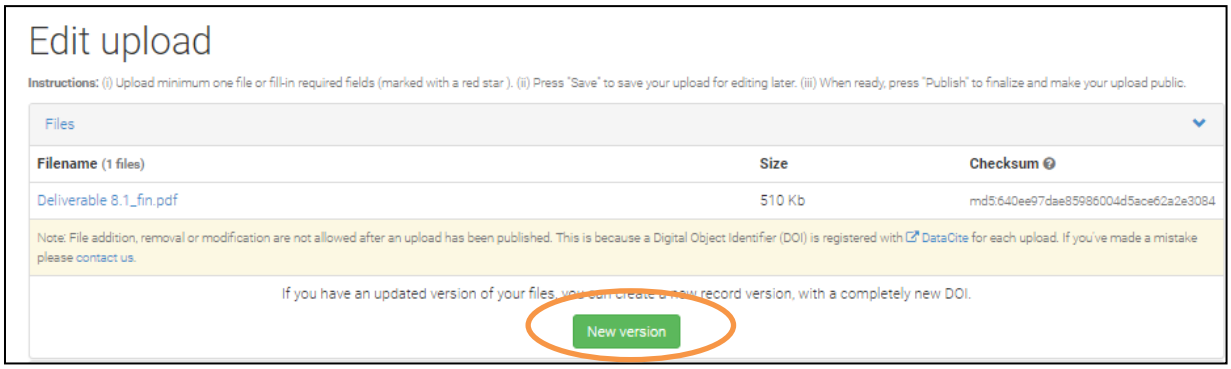
You can access the document details by clicking on the dataset name:



Once the record is saved or published, it is still possible to change the information except for

a. Uploaded document
b. DOI (if provided by Zenodo)

In case a new record version is ready for upload, we cannot change it but use the versioning option provided by Zenodo. Please note that versioning is allowed only for records with DOI provided by Zenodo.



Every time a new edit is saved on the page, the record needs to be published again for such changes to be visible to others.