

LEIbits | Leiden University Publication Bits

Kristina Hettne, Ph.D. | Digital Scholarship Librarian, Centre for Digital Scholarship, Leiden University

Alessa Gambardella, Ph.D. | Data Steward, Faculty of Science, Leiden University



Universiteit
Leiden
The Netherlands



LEIbits motivation

- To know where research data (from Leiden) is deposited and more
- To get researchers excited about FAIR and using the tools (without realizing it)

LEIbits design choices

Key design points	Why	How implemented
Low barrier of entry	To increase adoption	Anyone can start a project, using the Nanopub itself as the identifier
Low redundancy of content	To increase accuracy	Linked the 'set' of Nanopubs to the 'initial' Nanopub (i.e. the "Project Nanopub")
High integrity	To avoid false answers (due to requiring answers when they may be unknown)	Allowed for flexibility and non-constraint in strategic places (e.g. let the date be entered as YYYY, YYYY-MM, YYYY-MM-DD)
High relevance	To increase researcher retention (they already fill out so many metadata forms)	Limited to only 3 Nanopubs total Limited number of (required) triples per Nanopub Introduced AIDA claims Nanopub to spark curiosity in the power of Nanopubs as more than a registry
High level of semantic interoperability	To increase FAIRness	Did careful and thorough research into predicates and triple modelling

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Full ID: <https://w3id.org/kpxl/custom/project/terms/LEIbits> ()

Description

Researchers spend the majority of their time twofold – producing output and then looking for the output of others to, in turn, help them produce more output. For both of these activities, computers assist us. Unfortunately, the latter activity is a challenge because we often provide information in a way that is hard for the computer to understand; computers like structured information to provide meaningful knowledge. Therefore, the more structured our research output, the better computers can help us with our research.

LEIbits is a lean approach to self-reporting research findings in a structured way so that you can in turn more easily find and use them with the help of the computer.

1. Project

≡ [Defining a research project](#) - by Alessa An Gambardella, 2024-12-18

2. Dataset

≡ [Describing a dataset at summary level - simple](#) - by Alessa An Gambardella, 2025-01-17

3. Claims

≡ [Expressing a statement about research as an AIDA sentence](#) - by Alessa An Gambardella, 2024-12-19

Owners

 [Kristina Hettne](#)

 [Alessa An Gambardella](#)

LEIbits template 1 - assertion

Key design points

- Anyone can introduce a project, funded or not (e.g. a citizen)
- Mints an identifier rather than associated with another identifier project ID
- Serves as the 'initial' Nanopub to which all that follow in the 'set' of Nanopubs are linked
- Let the date be entered as YYYY, YYYY-MM, YYYY-MM-DD to avoid false answers due to restrictions
- 'Research Project' is a newer definition from Schema
- Limited the number of (required) triples to lower time spent, promote use
- Offer option to connect to other project Nanopubs
- Used dropdowns to ease use

Publish a new Nanopublication

 <https://w3id.org/np/...>

Introduce a project from anywhere by anyone

Assertion

Defining a research project ^

Template for defining a research project

This research project	is a	research project	.
This research project	is called	" name of research project "	.
This research project	has description	" description (if copied, with reference UR "	.
This research project	has website	a link to research project's website	.
(optional)			
This research project	has research domain	choose domain	.
(optional)			
This research project	is funded by	funder URI or name (between " ") if no U	.
(optional)			
This research project	has funder-provided identifier	research project URI from funder	.
(optional)			
This research project	starts on	" YYYY, YYYY-MM, or YYYY-MM-DD "	.
This research project	ends on	" YYYY, YYYY-MM, or YYYY-MM-DD "	.
This research project	is a part of	URI of larger research project	.
(optional)			
This research project	is related to	URIs of related research projects	.
(optional)			

LEIbits template 2 - assertion

Key design points

- Limited the number of (required) triples to lower time spent, promote use
- Wanted to merely point to published data in repos elsewhere because hard to find via Google Search or Google Dataset Search etc., to enhance not just findability but discoverability
- Linked to Project Nanopub, to drive connection of related content
- Made license optional to avoid false responses due to uncertainty
- Chose 'maintainer' as the predicate for 'has repository' rather than previously used 'publisher'
- *Future consideration*, pull in other metadata from repos

Publish a new Nanopublication

 <https://w3id.org/np/...>

Make data more findable & discoverable

Assertion

Describing a dataset at summary level - simple ^

Template for describing a dataset at summary level

<input type="text" value="URI of published dataset"/>	is a	dataset	.
<input type="text" value="URI of published dataset"/>	has title	" <input data-kind="parent" data-rs="2" type="text" value="title of published dataset"/> "	.
<input type="text" value="URI of published dataset"/>	has repository	<input type="text" value="URI of repository where dataset is publis"/>	.
<input type="text" value="URI of published dataset"/>	results from	<input type="text" value="URI of nanopublication for research ..."/>	.
<input type="text" value="URI of published dataset"/> (optional)	supports	<input type="text" value="URI of research output (e.g. publication)"/>	.
<input type="text" value="URI of published dataset"/> (optional)	has license	<input type="text" value="URI of license of published dataset"/>	.

LEIbits template 3 - assertion

Key design points

- Linked to Project Nanopub, to drive connection of related content
- Linked to dataset as an option, to allow flexibility
- *Future consideration*, connect to publications the claims are related to

Publish a new Nanopublication

 <https://w3id.org/np/...>

Experiment with making claims machine readable

Assertion

Expressing a statement about research as an AIDA sentence ^

Such nanopublications use the concept of an AIDA sentence to express a (scientific) statement in an informal or semi-formal manner, which can be

The sentence	<input type="text" value="Type your AIDA sentence here (ending v"/>	is an	<input type="text" value="AIDA sentence"/>	.
The sentence	<input type="text" value="Type your AIDA sentence here (ending v"/>	is about	<input type="text" value="URI of concept or topic the sentenc..."/>	.
(optional)				
The sentence	<input type="text" value="Type your AIDA sentence here (ending v"/>	is related to	<input type="text" value="URI of nanopublication for related r..."/>	.
The sentence	<input type="text" value="Type your AIDA sentence here (ending v"/>	is supported by	<input type="text" value="URI of nanopublication for related datas..."/>	.
(optional)				

LEIbits template 1,2,3 – provenance and pub info

Key design points

- Controlling provenance with a default
- Provenance both author of Nanopub assertion and Leiden University as the data owner and ‘location’
- Chose Leiden in provenance and not assertion because it applies to all the triples in the assertion (as data produced at Leiden) and not just to the subject

Provenance

Attributed to Leiden University ^

The assertion above is attributed to me (Alessa An Gambardella) .

The assertion above is attributed to Leiden University .

Publication info add elemen... ^

Creator ^

This nanopublication is created by me (Alessa An Gambardella) .

License ^

This nanopublication is published under the Attribution 4.0 International (CC BY x ^ license .

☐ I understand that publishing cannot be fully undone and that the provided information will be publicly visible and openly connected to my ORCID identifier (but nanopublications can be retracted, which makes them invisible in most situations).

Publish

LEIbits dashboard – datasets & repositories... just the tip of the iceberg!

Key metrics we want to measure

- Datasets per repositories
- Datasets per domain
- Datasets per user (indirectly, per Institute)
- Projects per domain

Our first researcher!

get-datasets

dataset	label	repository
Heart Disease	Heart Disease Dataset	Heart Disease
mtbls243	Collagen induced arthritis in dba/1j mice associates with oxylipin changes in plasma	RAdu_Z_Mi1
records/14827398	The Value of Data Dataset	zenodo.org
mtbls279	Metabolic characterization of the natural progression of chronic hepatitis B (Lipid assays)	RAdu_Z_Mi1
mtbls253	Metabolic characterization of the natural progression of chronic hepatitis B (Oxylipin assay)	RAdu_Z_Mi1
mtbls280	Metabolic characterization of the natural progression of chronic hepatitis B (Biogenic amine and Acyl-carnitine assays)	RAdu_Z_Mi1
mtbls449	Fetal Metabolic Stress Disrupts Immune Homeostasis and Induces Proinflammatory Responses in Human Immunodeficiency Virus Type 1- and Combination Antiretroviral Therapy-Exposed Infants	RAdu_Z_Mi1
mtbls8954	Exploring the Fecal Metabolome in Infants With Cow's Milk Allergy: The Distinct Impacts of Cow's Milk Protein Tolerance Acquisition and of Synbiotic Supplementation	RAdu_Z_Mi1
heart disease	Heart Disease	archive.ics.uci.edu

Introducing LEIbits to researchers

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Communicate your research with Nanopublications!

Achieve more impact.

Reach a larger audience.

Make your data more findable with search.

Contribute to the "Knowledge Space."

About LEIbits

Researchers spend the majority of their time twofold – producing output and then looking for the output of others to, in turn, help them produce more output. For both of these activities, computers assist. Unfortunately, the latter activity is a challenge because information produced through research is often hard for the computer to understand; computers like structured information to provide meaningful knowledge. Therefore, the more structured research output is, the better computers can help with research.

LEIbits is a lean approach to self-reporting research findings in a structured way so that you can more easily keep track, find, use, and share them with the help of the computer.

What are Nanopublications?

- Small iterative bits of structured information with associated descriptive information
- Published in the Knowledge Space – an open, decentralized global socio-technical ecosystem to share human knowledge

How are Nanopublications made?

- Make mini assertions about your research
- Publish the assertions using Nanodash

Why make Nanopublications now?

- See the impact of your contribution immediately
- Find scientific contributions of your Leiden research peers more easily

Instructions for creating Nanopublications

Step 1 - Login to Nanodash

- Login to Nanodash with your ORCID and associated password at: https://orcid.org/signin?client_id=APP-W02BIN0XPD5T5PFL&response_type=code&scope=%2Fauthenticate&redirect_uri=https:%2F%2Fnanodash.knowledgepixels.com%2F%2Forcidlogin%3Fredirect-hash%3Dcdb4ee2aea69cc6a83331bbe96dc2caa9a299d21329efb0336fc02a82e1839a8
- If you do not have ORCID, first make an account at: <https://orcid.org/register>

Step 2 - Communicate your research

- Choose whether you want to be an **Explorer**, a **Trailblazer**, or a **Pioneer** of Nanopublishing
 - **Explorer**: publish Nanopub #1
 - **Trailblazer**: publish Nanopub #1 and Nanopub #2
 - **Pioneer**: publish Nanopub #1, Nanopub #2, and Nanopub #3
- Create Nanopublications (or 'Nanopubs') communicating your research using Nanopubs that build upon each other
- Of note: after publishing Nanopub #1, you will be prompted via a pop to introduce yourself with another Nanopub. Follow the instructions accordingly and then continue with the next Nanopubs if you would like to publish more.

Nanopub #1 – Defining a research project

- In the following Nanopub, you are declaring the existence of a research project and describing it with a few key details.
- By doing so, you are making your research project more findable and interoperable. <https://nanodash.knowledgepixels.com/publish?26&template=https://w3id.org/np/RA9KrNsJEsvoMVnD3qgbB2rjKZSZeRkRWzt6dgS6En6sl&template-version=latest>
- When you press 'publish' for your first Nanopub, you will be prompted then to crest an introduction Nanopub in order to continue. Follow the prompts, and publish your introduction. After doing so, return to your filled in template for Nanopub #1 and press publish.

Introducing LEIbits to researchers

Nanopub #2 – Describing a dataset at summary level - simple

- In the following Nanopub, you are declaring the existence of a published dataset, connecting it to the project you introduced in Nanopub #1, and pointing to its location in a repository.
- By doing so, you are making your data more findable and reusable.
https://nanodash.knowledgepixels.com/publish?7&template=https://w3id.org/np/RAtp4x4rtAXOJP68aff7PNSBMht_goTL8aUObzKHxxNM4&template-version=latest

Nanopub #3 – Expressing a statement as an AIDA sentence

- In the following Nanopub, you are making a claim about your research and linking it to your project, Nanopub 1, and (optionally) your dataset, Nanopub 2.
- By doing so, you are communicating a small bit of information that is more FAIR than claims in ordinary publications.
https://nanodash.knowledgepixels.com/publish?13&template=https://w3id.org/np/RA4fmfVFULMP50FqDFX8fEMn66uDF07vXKFXh_L9aoQKE&template-version=latest

What are AIDA sentences? (description copied from link above)

- *Atomic*: a sentence describing one thought that cannot be further broken down in a practical way
- *Independent*: a sentence that can stand on its own, without external references like "this effect" or "we"
- *Declarative*: a complete sentence ending with a full stop that could in theory be either true or false
- *Absolute*: a sentence describing the core of a claim ignoring the (un)certainly about its truth and ignoring how it was discovered (no "probably" or "evaluation showed that"); typically in present tense

You can find more information about AIDA sentences [here](#).

How do you formulate an AIDA sentence from your research publication?

- One way to help you formulate an AIDA sentence is to ask ChatGPT for a summary of claims in your publication associated with the data you have mentioned in Nanopub 2. Then give it the definition of AIDA (found above or at the top of the Nanopub template) and ask it to turn those claims into AIDA sentences. Double check to make sure they make sense and are directly supported by the publication.
- Here is a set of 4 produced from a publication via this method:

- Concentrations of sulfur species in ultramarine pigment (i.e. lazurite) derived from heat-treated lapis lazuli differ from those in pigment derived from non-heat-treated lapis lazuli.
- The concentration of the trisulfur radical (S_3^-) in ultramarine pigment (i.e. lazurite) positively correlates with the temperature of heat-treatment applied to the lapis lazuli from which it derives.
- The intensity of the blue color in ultramarine pigment (i.e. lazurite) positively correlates with the temperature of heat-treatment applied to the lapis lazuli from which it derives.
- Nonnegative matrix factorization (NMF) separates spectral components of XANES spectra corresponding to contributions from sulfur species in ultramarine pigment (i.e. lazurite).

Step 3 - Visualize your contribution and those of others

- Explore the 'dashboard'
- For example, look at the repositories being used by Leiden researchers

What's next?

- Help us help you :) Please provide feedback by contacting Kristina and/or Alessa
 - Kristina:
<https://www.universiteitleiden.nl/en/staffmembers/kristina-hettne#tab-1>
 - Alessa:
<https://www.universiteitleiden.nl/en/staffmembers/alessa-gambardella#tab-1>