Lean Library Workspace API

Contents

LeanLibrary Workspace

General API Information

What our API can be used for

Our API allows a user to retrieve references, notes and projects which they have access to in Lean Library Workspace (e.g. those they have added themselves or which have been shared with them) in JSON format. It is also possible to retrieve a list of your references in BibTeX, RIS or CSV format.

User authorization

Our API can only be used to retrieve data from user accounts for which you have a valid access token. An access token can be generated by any user by performing the following steps:

- Sign in to Lean Library Workspace with the relevant user
- Go to **My Account > External API**
- Here you can view/copy your token or generate a new one (please note that generating a new token will invalidate any existing token for this user account)

This access token should be supplied in the API request as an HTTP header in the form:

```
Authorization: Bearer [Access token]
```

API limitations

An access token can only be used to make 100 requests per 60 seconds; if more requests than this are made then an error message will be returned as detailed in Rate Limiting.

Base URL

The base URL for the Lean Library Workspace API is:

```
https://workspace.leanlibrary.com/extapi/work/
```

Please note that requests must use HTTPS.

General parameters and points of interest

Pagination/Limitation of results

Some requests returning multiple objects will return them in a paginated fashion. In such cases the full list of items will be returned containing pagination fields; the user can also specify their own page size, or choose to only return specific pages from the results. Examples of requests which include pagination parameters can be seen here, the details of the parameters are listed below:

```
https://workspace.leanlibrary.com/extapi/work/references?page=3&size=25
https://workspace.leanlibrary.com/extapi/work/references?size=2
```

Name	Type	Mandatory	Values	Default	Information
page	Integer	N	1,2,3...	1	Retrieve a specific page from the results (e.g. return page 3)
size	Integer	N	1 - 100	20	Number of results to include per page

Where a response is paginated, the results will return with the following JSON fields:

Name	Type	Information
total	Integer	Total number of items matching query parameters
results	List	List of result items in the current page
page	Integer	Current page number
pageSize	Integer	Number of results returned per page (note, the results list may be smaller than this if fewer items are returned)
totalPages	Integer	Total number of pages as determined by pageSize

HTTP status codes and Error handling

The API will respond to requests with one of the following codes:

HTTP Code	Information
200 Ok	Successful request
401 Unauthorized	User authorization error (e.g., invalid authorization token), or client has broken the rate limit
403 Forbidden	Insufficient privileges for the request
500 Internal Server Error	Server-related issue. Please contact us if the error persists

Rate limiting

The Lean Library Workspace API is currently rate-limited to prevent abuse. If too many requests are made in a given period, the API will return the error 401 Unauthorized. Clients receiving this error code should wait for 60 seconds and then try again.

Null output fields

Please note that some fields in the JSON output (for example pubmedCitationsCount in a reference object) can be null values.

LeanLibrary Workspace

API requests

Requesting references in bulk

Base HTTP GET request

```
https://workspace.leanlibrary.com/extapi/work/references
```

This request will return metadata for references in the requesting user's library (whether created by or shared with the user). If no further parameters are included then all references will be returned.

Query parameters

Note that in addition to the following list, reference results are paginated.

Name	Type	Mandatory	Information
query	String	N	Query terms which match any field in the reference
projectId	Integer	N	Query only for references inside this project. The user must be a member of queried projects
tagIds	Array of Integer	N	Return only references tagged with ALL given tag ids
bookmarked	Boolean	N	Return only references in the user's Reading List
unsorted	Boolean	N	Return only references which are not in any project
incomplete	Boolean	N	Return only references with missing citation data (missing metadata details)
sort	Map<Key,Value>	N	Order results according to a set of fields of your choice - see Sort options (key-value pairs)

LeanLibrary Workspace

Sort options (key-value pairs)

Key	Value	Information
relevance	asc,desc	Relevance of reference as determined by query parameters
title	asc,desc	Reference title
firstAuthor	asc,desc	First author (Last name)
lastAuthor	asc,desc	Last author (Last name)
publishedDate	asc,desc	Publication date
addedDate	asc,desc	Date the article was added to Lean Library Workspace
journalName	asc,desc	Journal name
itemId	asc,desc	Reference ID (internal Lean Library Workspace ID)
firstEditor	asc,desc	Book/series first editor (Last name)
chapter	asc,desc	Chapter title
url	asc,desc	Reference URL
itemType	asc,desc	Reference type (e.g. Article, Book, Thesis etc.)
publisher	asc,desc	Publisher name
edition	asc,desc	Edition (for supported types e.g. Book, Report)
publicationPlace	asc,desc	Place of publication (for supported types e.g. Book, Patent)
volume	asc,desc	Volume
issue	asc,desc	Issue number
pagination	asc,desc	Reference pagination (location in original publication, not to be confused with API result pagination)
doi	asc,desc	DOI ID
pubMedId	asc,desc	PubMed ID

Key	Value	Information
patentNumber	asc,desc	Patent Number/ID
addedByName	asc,desc	Last name of user who added the reference to Lean Library Workspace
hasPdf	asc,desc	Whether the reference has a PDF attached in Lean Library Workspace

Output fields

Name	Type	Information
id	Integer	Reference ID (internal Lean Library Workspace ID)
type	String	See Available values for Type field
pubMedId	Integer	PubMed identifier
doi	String	DOI identifier
pmcId	String	PubMed Central identifier
title	String	Title
abstractText	String	Abstract text
publicationDate	String	String representation of publication date
publishedYear	Integer	Year of publication
volume	String	Volume
issue	String	Issue
pagination	String	Pages of issue reference appears on
journalName	String	Journal name
journalAbbreviation	String	Journal abbreviation

Name	Type	Information
authorsText	String	Author names, comma-separated (e.g. Smith RA, Doe J)
fullTextLink	String	URL of full text on web
pdfUrl	String	URL of PDF in Lean Library Workspace
pdfSize	Long	PDF file size (bytes)
f1000Recommended	Boolean	Article recommended in Faculty Opinions
f1000Bookmarked	Boolean	Reference is in the user's Reading List
f1000Incomplete	Boolean	Reference has missing citation data
f1000NotesCount	Integer	Number of notes by current user/collaborators
f1000AddedBy	String	User who added this reference to Lean Library Workspace
f1000AddedDate	Date	Date reference added to Lean Library Workspace (time in milliseconds since Jan 1, 1970 00:00:00 UTC)
f1000RecommendationsCount	Integer	Number of times article recommended in Faculty Opinions
f1000Tags	List<String>	Tags applied to the reference
pubmedCitationsCount	Integer	Number of times article was cited according to Europe PMC

Available values for Type field

Type	Information
BLOG_POST	Social media Post
BOOK	Book
BROADCAST	Broadcast

Type	Information
CONFERENCE_PAPER	Conference paper
F1000_ARTICLE	Journal Article (metadata is partially curated by Lean Library Workspace)
FILM	Film
FORUM_POST	Forum post
LEGAL_CASE	Legal case
MAGAZINE_ARTICLE	Magazine article
MANUAL_ITEM_PDF	PDF
MANUSCRIPT	Manuscript (where uploaded to an Lean Library Workspace project)
MAP	Map
NEWSPAPER_ARTICLE	Newspaper article
OTHER	Other
PATENT	Patent
PERSONAL_COMMUNICATION	Personal communication
PRESENTATION	Presentation
REPORT_PAPER	Report paper
RESEARCH_ARTICLE	Journal article (metadata is curated by F1000Research)
SOFTWARE	Software
THESIS	Thesis
WEBSITE	Webpage

Example reference object

```
{
 "id": "780682",
 "type": "RESEARCH_ARTICLE",
 "pubMedId": "10756000",
 "doi": null,
 "pmcId": "PMC100153",
 "title": "Zygomycetes in human disease.",
 "abstractText": "The Zygomycetes represent relatively uncommon isolates in the
clinical laboratory, reflecting either environmental contaminants or, less
commonly, a clinical disease called zygomycosis. There are two orders of
Zygomycetes containing organisms that cause human disease, the Mucorales and the
Entomophthorales.",
 "publicationDate": "2000 Apr",
 "publishedYear": 2000,
 "volume": "13",
 "issue": "2",
 "pagination": "236-301",
 "journalName": "Clinical Microbiology Reviews",
 "journalAbbreviation": "Clin Microbiol Rev",
 "authorsText": "Ribes JA, Vanover-Sams CL, Baker DJ",
 "fullTextLink": "https://www.ncbi.nlm.nih.gov/pubmed/10756000",
 "pdfUrl": null,
 "pdfSize": null,
 "f1000Recommended": false,
 "f1000Bookmarked": false,
 "f1000Incomplete": false,
 "f1000NotesCount": 0,
 "f1000AddedBy": "Katherine Kalinina",
 "f1000AddedDate": 1495354383561,
 "f1000RecommendationsCount": 0,
 "f1000Tags": [],
 "pubmedCitationsCount": null
}
```

Example reference queries & responses

Query 1: *Sorted by title, returning a maximum of 2*

```
https://workspace.leanlibrary.com/extapi/work/references?sort=title:desc&size=2
```

Response 1

```
{
 "total": 7197,
 "results": [
 {
 "id": "780682",
 "type": "RESEARCH_ARTICLE",
 "pubMedId": "10756000",
 "doi": null,
 "pmcId": "PMC100153",
 "title": "Zygomycetes in human disease.",
 "abstractText": "The Zygomycetes represent relatively uncommon isolates in the
clinical laboratory, reflecting either environmental contaminants or, less
commonly, a clinical disease called zygomycosis.",
 "publicationDate": "2000 Apr",
 "publishedYear": 2000,
 "volume": "13",
 "issue": "2",
 "pagination": "236-301",
 "journalName": "Clinical Microbiology Reviews",
 "journalAbbreviation": "Clin Microbiol Rev",
 "authorsText": "Ribes JA, Vanover-Sams CL, Baker DJ",
 "fullTextLink": "https://www.ncbi.nlm.nih.gov/pubmed/10756000",
 "pdfUrl": null,
 "pdfSize": null,
 "f1000Recommended": false,
 "f1000Bookmarked": false,
 "f1000Incomplete": false,
 "f1000NotesCount": 0,
 "f1000AddedBy": "Katherine Kalinina",
 "f1000AddedDate": 1495354383561,
 "f1000RecommendationsCount": 0,
 "f1000Tags": [],
 "pubmedCitationsCount": null
```

```
},
{
"id": "780240",
"type": "RESEARCH_ARTICLE",
"pubMedId": "19687044",
"doi": "10.1098/rstb.2009.0089",
"pmcId": "PMC2865092",
"title": "Zoonotic helminth infections with particular emphasis on fasciolosis
and other trematodiases.",
"abstractText": "Zoonotic infections are among the most common on earth and are
responsible for >60 per cent of all human infectious diseases.",
"publicationDate": "2009 Sep 27",
"publishedYear": 2009,
"volume": "364",
"issue": "1530",
"pagination": "2763-2776",
"journalName": "Philosophical Transactions of the Royal Society of London.
Series B, Biological Sciences",
"journalAbbreviation": "Philos Trans R Soc Lond, B, Biol Sci",
"authorsText": "Robinson MW, Dalton JP",
"fullTextLink":
"https://workspace.leanlibrary.com/fulltext/doi/10.1098/rstb.2009.0089",
"pdfUrl": null,
"pdfSize": null,
"f1000Recommended": false,
"f1000Bookmarked": false,
"f1000Incomplete": false,
"f1000NotesCount": 0,
"f1000AddedBy": "Katherine Kalinina",
"f1000AddedDate": 1495354230189,
"f1000RecommendationsCount": 0,
"f1000Tags": [],
"pubmedCitationsCount": null
}
],
"page": 1,
"pageSize": 2,
"totalPages": 3599
}
```

Query 2: References in a project with two tags applied

```
https://workspace.leanlibrary.com/extapi/work/references?projectId=336430&tagIds
=468&tagIds=1215
```

Response 2

```
{
 "total": 1,
 "results": [
 {
 "id": "930395",
 "type": "RESEARCH_ARTICLE",
 "pubMedId": "28766364",
 "doi": "10.4155/bio-2017-0102",
 "pmcId": null,
 "title": "Overcoming disease-specific matrix effect in a clinical
pharmacokinetic assay using a microfluidic immunoassay technology.",
 "abstractText": "<strong>AIM:</strong> Etrolizumab, a humanized monoclonal
antibody, has demonstrated clinical remission in a Phase II study of ulcerative
colitis patients. In the Phase III program.",
 "publicationDate": "2017 Aug 02",
 "publishedYear": 2017,
 "volume": "",
 "issue": "",
 "pagination": "",
 "journalName": "Bioanalysis",
 "journalAbbreviation": "Bioanalysis",
 "authorsText": "Williams K, Erickson R, Fischer SK",
 "fullTextLink":
"https://workspace.leanlibrary.com/fulltext/doi/10.4155/bio-2017-0102",
 "pdfUrl": null,
 "pdfSize": null,
 "f1000Recommended": false,
 "f1000Bookmarked": false,
 "f1000Incomplete": false,
 "f1000NotesCount": 0,
 "f1000AddedBy": "Claire Thorne",
 "f1000AddedDate": 1504689229198,
 "f1000RecommendationsCount": 0,
 "f1000Tags": [
```

```
  "WasRead",
  "WebSite"
  ],
  "pubmedCitationsCount": null
  }
  ],
  "page": 1,
  "pageSize": 20,
  "totalPages": 1
}
```

Requesting a single reference

Base HTTP GET request

```
https://workspace.leanlibrary.com/extapi/work/references/{id}
```

This request will return metadata for the reference with id number {id} in the requesting user's library (whether created by or shared with the user).

Example

Query: Return metadata for reference ID 933202

```
https://workspace.leanlibrary.com/extapi/work/references/933202/
```

Response

```
{
  "id": "933202",
  "type": "RESEARCH_ARTICLE",
  "pubMedId": "30024914",
  "doi": "10.1371/journal.pone.0200455",
  "pmcId": "PMC6053154",
  "title": "Multiqubit and multilevel quantum reinforcement learning with
quantum technologies.",
  "abstractText": "We propose a protocol to perform quantum reinforcement
learning with quantum technologies. At variance with recent results on quantum
reinforcement learning with superconducting circuits, in our current protocol
```

```
coherent feedback during the learning process is not required, enabling its
implementation in a wide variety of quantum systems. We consider diverse
possible scenarios for an agent, an environment, and a register that connects
them, involving multiqubit and multilevel systems, as well as open-system
dynamics. We finally propose possible implementations of this protocol in
trapped ions and superconducting circuits. The field of quantum reinforcement
learning with quantum technologies will enable enhanced quantum control, as
well as more efficient machine learning calculations.",
 "publicationDate": "2018 Jul 19",
 "publishedYear": 2018,
 "volume": "13",
 "issue": "7",
 "pagination": "e0200455",
 "journalName": "Plos One",
 "journalAbbreviation": "PLoS ONE",
 "authorsText": "Cárdenas-López FA, Lamata L, Retamal JC, Solano E",
 "fullTextLink":
"https://workspace.leanlibrary.com/fulltext/doi/10.1371/journal.pone.0200455",
 "pdfUrl": null,
 "pdfSize": "2356610",
 "f1000Recommended": false,
 "f1000Bookmarked": false,
 "f1000Incomplete": false,
 "f1000NotesCount": 1,
 "f1000AddedBy": "Yeshayahu Leibowitz",
 "f1000AddedDate": 1533109436268,
 "f1000RecommendationsCount": 0,
 "f1000Tags": [],
 "pubmedCitationsCount": "0"
}
```

Generating reference metadata files

Base HTTP GET request

```
https://workspace.leanlibrary.com/extapi/work/references/export
```

This request will generate metadata for references in one of the following formats - BibTeX, RIS, CSV. A maximum of 10,000 references can be generated in a single request.

Query parameters

Name	Type	Values	Default	Mandatory	Information
projectId	Integer	1,2,3...	-	N	Generate metadata for all references inside this project. If none is supplied, all items in the user's library will be exported
exportType	Enum	BIBTEX, RIS, CSV	BIBTEX	N	Desired export format (if none is supplied then a BibTeX file will be returned). Note that the values are case-sensitive

Example

Query: Generate metadata for all references inside project with id 443377 in BibTeX format

```
https://workspace.leanlibrary.com/extapi/work/references/export?projectId=44337
7
```

Response

```
@article{crdenaslpez_2018,
title = {Multiqubit and multilevel quantum reinforcement learning with quantum
technologies.},
author = {Cárdenas-López, F A and Lamata, L and Retamal, J C and Solano, E},
pages = {e0200455},
url = {http://dx.doi.org/10.1371/journal.pone.0200455},
year = {2018},
month = {jul},
day = {19},
urldate = {2018-08-01},
journal = {{PLoS} {ONE}},
volume = {13},
number = {7},
doi = {10.1371/journal.pone.0200455},
pmid = {30024914},
pmcid = {PMC6053154},
```

```
f1000-projects = {collection1},
abstract = {We propose a protocol to perform quantum reinforcement learning with
quantum technologies. At variance with recent results on quantum reinforcement
learning with superconducting circuits, in our current protocol coherent
feedback during the learning process is not required, enabling its
implementation in a wide variety of quantum systems. We consider diverse
possible scenarios for an agent, an environment, and a register that connects
them, involving multiqubit and multilevel systems, as well as open-system
dynamics. We finally propose possible implementations of this protocol in
trapped ions and superconducting circuits. The field of quantum reinforcement
learning with quantum technologies will enable enhanced quantum control, as well
as more efficient machine learning calculations.}
}
```

Requesting notes

Notes can be requested either for a given reference {id} (this refers to the Lean Library Workspace reference ID) or a given project {id} (this refers to the Lean Library Workspace project ID), made by either the user or other members they are sharing the reference/project with.

Project notes: Base HTTP GET request

```
https://workspace.leanlibrary.com/extapi/work/references/{id}/notes
```

This request will return a list of all notes made on the entered reference {id} (this refers to the Lean Library Workspace reference id), made either by the user or other members of the shared project.

Query parameters

Name	Type	Value	Mandatory	Information
sortingOrder	Enum	asc,desc	N	Sort by date each note was last updated

Output fields

Name	Type	Information
id	Integer	Note ID (Internal Lean Library Workspace ID)
user	String	User who made the note (e.g. Joe Johnson)

comment	String	Note comment content
highlightText	String	Text highlighted as part of note using the Lean Library Workspace browser extension (where applicable)
replies	List	List of replies to note (each reply is a note object)
created	Long	Number of seconds passed since the note was created (at time response was generated)
updated	Long	Number of seconds passed since the note was last updated (at time response was generated)
url	String	URL of highlighted reference/PDF file (where applicable)

Example note object

```
{
 "id": "31498",
 "user": "Joe Johnson",
 "comment": "We should think about the meta-analysis.",
 "highlightText": "Anxiety disorders",
 "replies": [],
 "created": 15504,
 "updated": 8947,
 "url": "http://onlinelibrary.wiley.com/doi/10.1002/ptr.5940/abstract"
}
```

Example note query & response

Query: Return all notes for reference ID 933202

```
https://workspace.leanlibrary.com/extapi/work/references/933202/notes
```

Response

```
[
 {
 "id": "31498",
 "user": "Katya Gorodinsky",
 "comment": "This is very important",
 "highlightText": "Anxiety disorders",
 "replies": [],
 "created": 15857,
 "updated": 9300,
 "url": "http://onlinelibrary.wiley.com/doi/10.1002/ptr.5940/abstract"
 },
 {
 "id": "31496",
 "user": "John Spencer",
 "comment": "We should check what are the implications",
 "highlightText": null,
 "replies": [
 {
 "id": "31497",
 "user": " Katya Gorodinsky",
 "comment": "I will investigate it",
 "highlightText": null,
 "replies": [],
 "created": 17096,
 "updated": null,
 "url": null
 }
 ],
 "created": 17257,
 "updated": 16626,
 "url": null
 }
]
```

Requesting Projects

Base HTTP GET request

```
https://workspace.leanlibrary.com/extapi/work/projects
```

This request will return a list of all projects the user is a member of (whether created by or shared with them).

Query parameters

Projects returned by the query are paginated.

Output fields

Name	Type	Information
id	Integer	Project ID (Internal Lean Library Workspace ID)
name	String	Project name
children	List	Subprojects (each subproject is a project object)
parentId	Integer	ID of the parent project (where the current project is a subproject)

Example project object

```
{
"id": "318677",
"name": "Hebrew citation in WP",
"children": [
{
"id": "319349",
"name": "article",
"children": [],
"parentId": "318677"
},
{
"id": "319348",
"name": "book",
"children": [],
"parentId": "318677"
}
```

```
  ],
  "parentId": null
}
```

Example project query & response

Query: Return list of projects, 5 per page, only displaying page 3

```
https://workspace.leanlibrary.com/extapi/work/projects?size=5&page=3
```

Response

```
{
 "total": 23,
 "results": [
 {
 "id": "338028",
 "name": " Hebrew citation in WP",
 "children": [],
 "parentId": null
 },
 {
 "id": "329464",
 "name": "Climate research",
 "children": [],
 "parentId": null
 },
 {
 "id": "338026",
 "name": "Lung Cancer",
 "children": [],
 "parentId": null
 },
 {
 "id": "337503",
 "name": "Biology Research Group",
 "children": [
 {
 "id": "337504",
```

```
"name": "Alpha",
"children": [],
"parentId": "337503"
}
],
"parentId": null
},
{
"id": "329460",
"name": "Environmental Changes",
"children": [],
"parentId": null
}
],
"page": 3,
"pageSize": 5,
"totalPages": 5
}
```

Contact details

If you have any problems or questions, please do feel free to contact us via the Lean Library Workspace site, or by emailing user-support@leanlibrary.com.