



Presented at the FIG Working Week 2020,
10-14 May 2020 in Amsterdam, the Netherlands

**Florian Thiery & Sophie C. Schmidt & Timo Homburg
Martina Trognitz & Monika Przybilla**



SPARQLing Geodesy for Cultural Heritage

New Opportunities for Publishing and
Analysing Volunteered Linked (Geo-)Data





Timo



Martina



Sophie



Florian



Monika



Research Squirrel Engineers



Geodesy 4.0

knowledge era

*Machine Learning
Artificial Intelligence
Semantic Reasoning*

Geodesy 2.0

digital era

*digital data, standards
geoserver, leaflet, open layers*

Geodesy 3.0

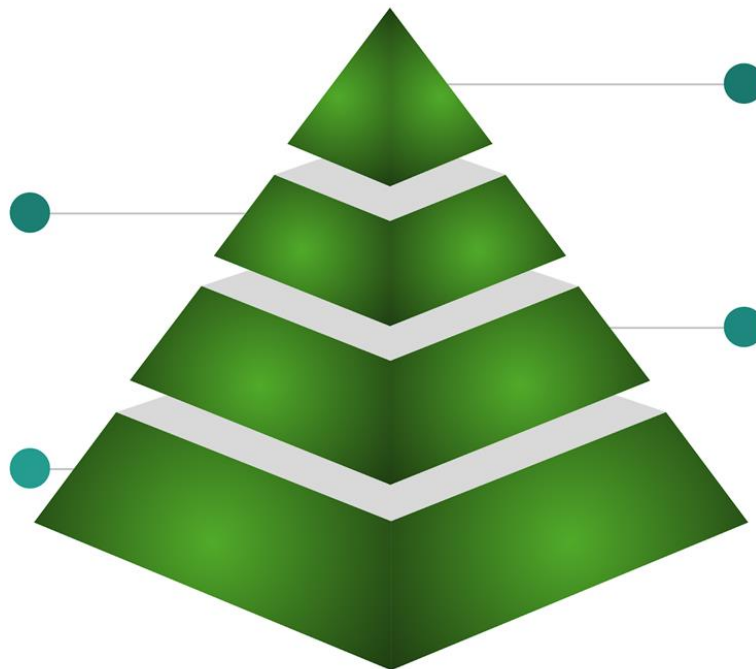
semantic era

*Semantic Modelling
Linked Data*

Geodesy 1.0

analogue era

analogue fieldbook



[Florian Thiery / CC BY 4.0](#)



**Linked
Open
Usable
Geodata**

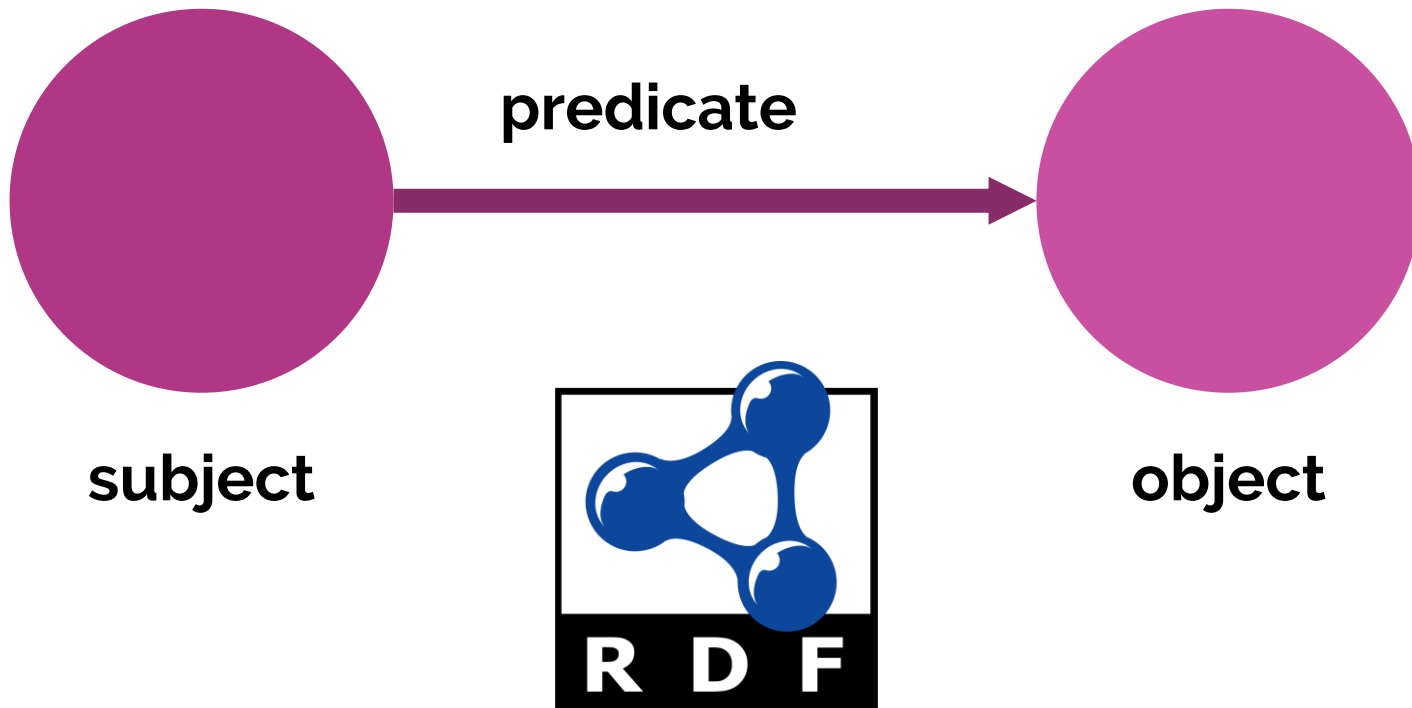


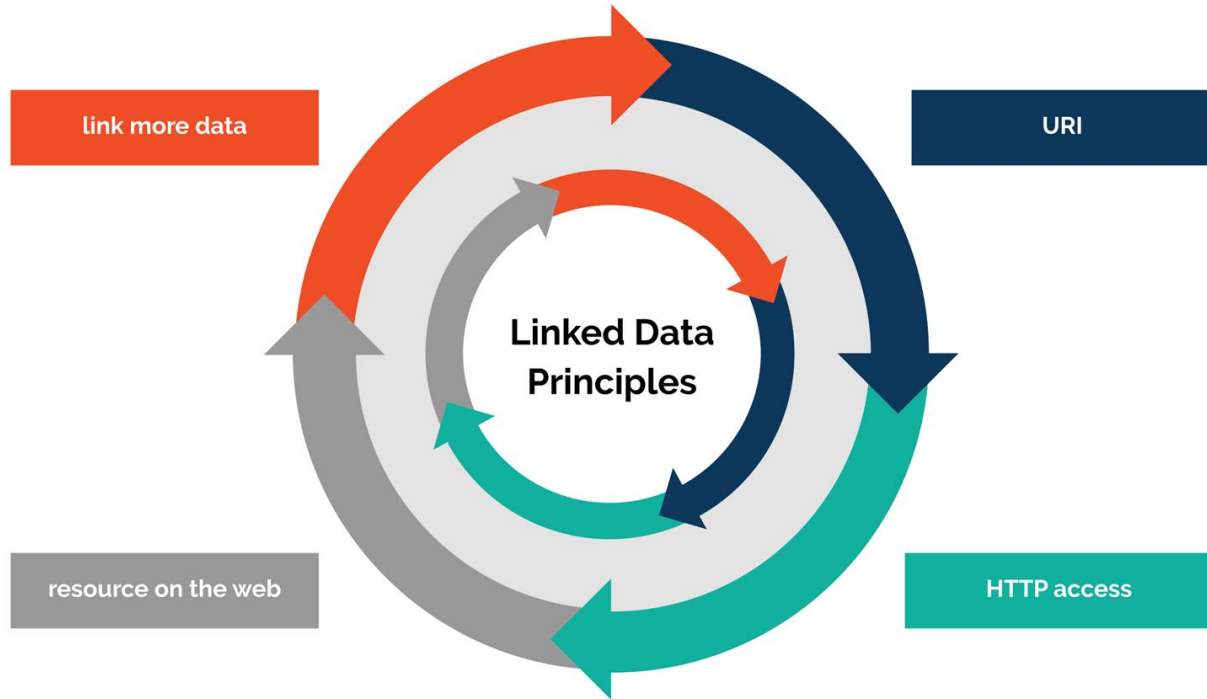
Linked (Open) Data
Open Data
Open Source Software
Open Access
Geo Data
Usable Data/Interfaces

[Florian Thiery / CC BY 4.0](#)



providing data on the Internet in standards





[Florian Thiery / CC BY 4.0](#)



data.geohive.ie

Serving Ireland's geospatial information as Linked Data.

About the Initiative

The goal of Ordnance Survey Ireland's (OSI) initiative with ADAPT is to develop a platform to publish OSI's geospatial data as Linked Data on the Web whilst adhering to best practices in the domain of geospatial information. The publication of Linked Data enables third parties to explore and consume rich data in a meaningful manner via a combination of simple, standardized technologies (e.g., RDF and URI) that operate over the Web's existing HTTP infrastructure.

[View details »](#)

Download

Ordnance Survey Ireland's geospatial data is available via a Linked Data frontend (e.g., by following the HTTP URI of County Dublin) and as downloadable datasets for local use.

[View details »](#)

Contact and Legal

Contact us:

- [Corporate](#)
- [Geohive](#)

Or send us an email via geohive@osi.ie.

Legal:

- [Corporate](#)
- [Privacy](#)
- The data served by the OSI via the Linked Data frontend, query endpoints and files is licensed under CC BY 4.0.

DUBLIN at OSI Geohive

<http://data.geohive.ie/resource/county/2ae19629-144f-13a3-e055-000000000001>

Property	Value
geo:hasGeometry	<geometrical_recessation>
rdfs:label	<ul style="list-style-type: none">• Baile Atha Cliath (ga)• DUBLIN (en)• DUBLIN
geohive:loganmid	<https://www.loganm.ie/ga/100002>
owl:similarTo	<http://dbpedia.org/resource/County_Dublin>
rdf:type	<ul style="list-style-type: none">• geohive:County• geo:Feature

[As Turtle](#) | [As RDF/XML](#)



© 2019 [Ordnance Survey Ireland](#) Linked Data Frontend powered by [Pubby](#).



Property	Value
geo:hasGeometry	<geometrical_recessation>



© 2019 Ordnance Survey Ireland.

LOD at Ordnance Survey Ireland



RSE

Ordnance Survey

You are here: [linked-data](#) > [ordnance-survey-linked-data](#)

Ordnance Survey Linked Data

The Ordnance Survey is Great Britain's national mapping agency, providing the most accurate and up-to-date geographic data, relied on by government, business and individuals.

OS OpenData is the opening up of Ordnance Survey data as part of the drive to increase innovation and support the "Making Public Data Public" initiative. As part of this initiative Ordnance Survey has published a number of its products as Linked Data.

This dataset combines three separate linked data resources: the 1:50 000 Scale Gazetteer, Code-Point Open and the administrative geography gazetteer for Great Britain.

Explore this dataset [Read more about this dataset](#)

Find things by keyword powered by SEARCH

Enter a keyword... [Examples](#)

[Find](#) [Reset](#)

Find things using a query powered by SPARQL

Lookup an identifier powered by LOOKUP

Turn labels into identifiers powered by RECONCILIATION

Dataset Summary

OS OpenData

License: OS Open Data License

Created: October 25th, 2010

Updated: August 30th, 2018

Size: 60,136,519 triples

Coverage: England, Scotland, Wales

Ontologies: Postcode Ontology
The administrative geography and civil voting area ontology
Geometry Ontology
Spatial Relations Ontology
50k Gazetteer

Export the dataset metadata as JSON, XML, or Turtle or download the raw data

Ordnance Survey © Crown copyright 2018 [Contact us](#)

Ordnance Survey

You are here: [linked-data](#) > [ordnance-survey-linked-data](#) > [edinburgh](#)

Edinburgh

Map powered by OS OpenSpaces

Zoom to: [Country](#) [County](#) [District](#) [City Area](#) [City](#) [Street](#)

© Crown copyright and database rights 2018 Ordnance Survey

Edinburgh is a Named Place

Objects related to "Edinburgh"

Feature Type	Value
TwentyKMGrid Reference	NT26
Feature Type	City
OneKMGrid Reference	NT2773
Map Reference	66

referenced via Primary Topic by: <http://data.ordnancesurvey.co.uk/id/50kGazetteer/3103>

Core facts about "Edinburgh"

Type	Named Place
Label	Edinburgh
Name	Edinburgh
Northing	673500
Easting	327500

Use this data in your app! Explore the underlying dataset and APIs or export the information about Edinburgh as JSON, XML, or Turtle.

Find Edinburgh products in the OS Online Shop

Find maps, clothing, GPS, and more

LOD at Ordnance Survey (United Kingdom)



LinkedGeoData.org

Adding a spatial dimension to the Web of Data.

Project created by:



- About / News
- Downloads
- Online Access
- RDF Mapping
- Use Cases
- LGD Browser
- Publications
- Community
- Blog
- Contact / Imprint

2018 May 7: [Linked Data interface operation back to normal](#)
[Quick Links](#) [Downloads](#) – [SPARQL](#) – [Virtual-SPARQL](#) by [Sparqlify](#) – [HTML interface](#) – [Example Queries](#)

LinkedGeoData is an effort to add a spatial dimension to the Web of Data / Semantic Web. LinkedGeoData uses the information collected by the OpenStreetMap project and makes it available as an RDF knowledge base according to the Linked Data principles. It interlinks this data with other knowledge bases in the Linking Open Data initiative.



News

[LinkedGeoData: New RDF versions of OpenStreetMap datasets available](#)

The AKSW research group is happy to announce that a new LinkedGeoData maintenance release with more than 1.2 billion triples based on the OpenStreetMap planet file from 2015-11-02 is now online. Enjoy! [Quick Links Project Website Downloads SPARQL Endpoint Virtual](#) ... [Continue reading](#) -->

[AKSW at #ISWC2014. Come and join, talk and discuss with us!](#)

Hello AKSW Follower! We are very pleased to announce that nine of our papers were accepted for presentation at ISWC 2014. In the main track of the conference we will present the following papers: [AGDISTIS – Graph-Based Disambiguation of Named](#) ... [Continue reading](#) -->

[AKSW at TU Dresden PLT](#)

On June 8, I (Jens) visited the process control engineering research group (PLT) of Leon Urbas at the Dresden University of Technology. We first met on the Leipzig Semantic Web Day where Leon Urbas presented interactive Linked Data applications and ... [Continue reading](#) -->

The LinkedGeoData Knowledge Base

In order to employ the Web as a medium for data and information integration, comprehensive datasets and vocabularies are required as they enable the disambiguation and alignment of other data and information. Many real-life information integration and aggregation tasks are impossible without comprehensive background knowledge related to spatial features of the ways, structures and landscapes surrounding us.

LinkedGeoData uses the comprehensive [OpenStreetMap](#) spatial data collection to create a large spatial knowledge base. It consists of more than 3 billion nodes and 300 million ways and the resulting RDF data comprises approximately 20 billion triples. The data is available according to the Linked Data principles and interlinked with DBpedia and Geo Names.

Community driven LOD via LinkedGeodata.org (OSM)



I could
use...



wikidata.org



Do you know
Wikidata?

How can the community publish data openly?



- ❖ **A free and open knowledge base**
→ **everybody can add and edit**
- ❖ central storage for structured data of **Wikimedia** projects

data in **Wikidata** is:

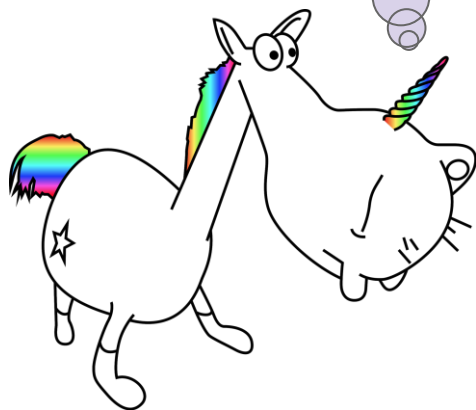
- ❖ available under a free license (CC 0)
- ❖ multilingual
- ❖ [accessible](#) to humans and machines (GUI & API & SPARQL)
- ❖ [exportable](#) using standard formats (JSON, RDF, XML)
- ❖ interlinked to other open data sets on the LOD Cloud



What is Wikidata?



How can I help researchers
without knowledge of
SPARQL in using community
driven data from Wikidata?



SPARQL unicorn



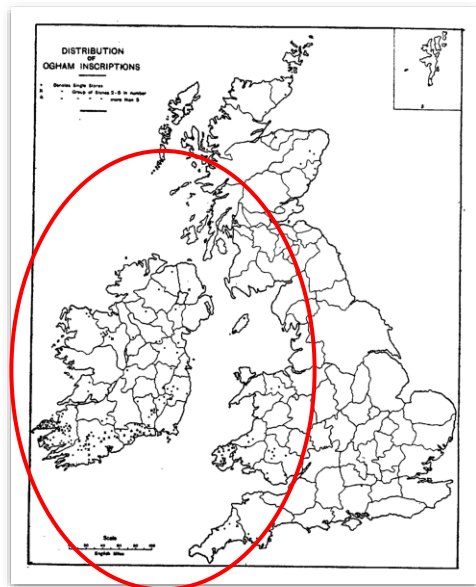
I could use...



<https://plugins.qgis.org/plugins/sparqlunicorn/>



...the **SPARQLing Unicorn QGIS Plugin!**



[R.A.S. Macalister, Corpus inscriptionum insularum Celticarum, vol. I \(1945\)](#) / p.502

4th-9th century AD

Distribution:

Ireland

(+Wales, England, Isle of Man)

Information on people
and their families /
tribal affiliation



Ogham Inscriptions



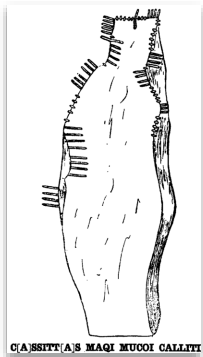
I want to look at all Ogham Stones from Ireland..
Where do I find them?



UCC Stone Corridor, Stone 4, CIIC 81 (Florian Thiery) CC BY 4.0



R.A.S. Macalister, Corpus inscriptionum insularum Celticarum, vol. I (1945)



Linked Ogham??

Online & Open:

3D Ogham Project:

<https://ogham.celt.dias.ie>

Heritage Management:

<http://webgis.archaeology.ie/historicenvironment/>

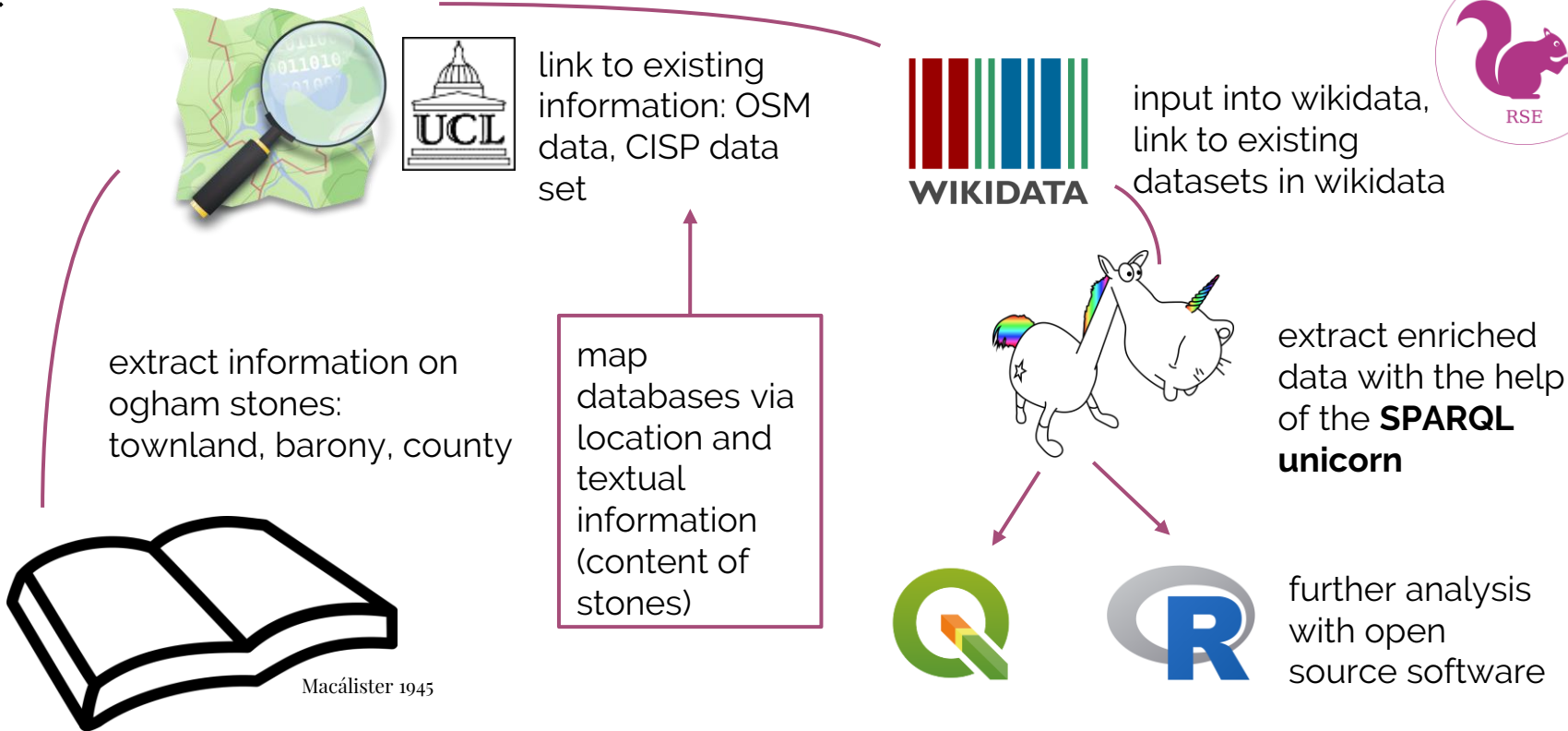
Online: CISP

<https://www.ucl.ac.uk/archaeology/cisp/database>



Offline:

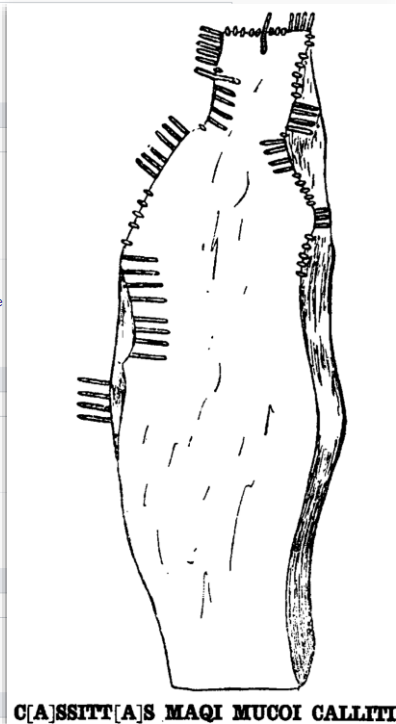
CIIC by Macàlister
div. publications



The Workflow



inscription	QID C[A]SSITT[A]S MAQI MUCOI CALLITI (Irish) <small>apparently part of a larger inscription, presumably</small> ▶ 1 reference
series ordinal	QID 81 criterion used Corpus Inscriptionum Insularum Celtaicarum Vol.1 ▶ 1 reference
	QID 4 criterion used Stone Corridor University College Cork ▶ 1 reference
inscription mentions	QID MAQI ▶ 1 reference
	QID MUCOI ▶ 1 reference
state of conservation	QID preserved ▶ 1 reference



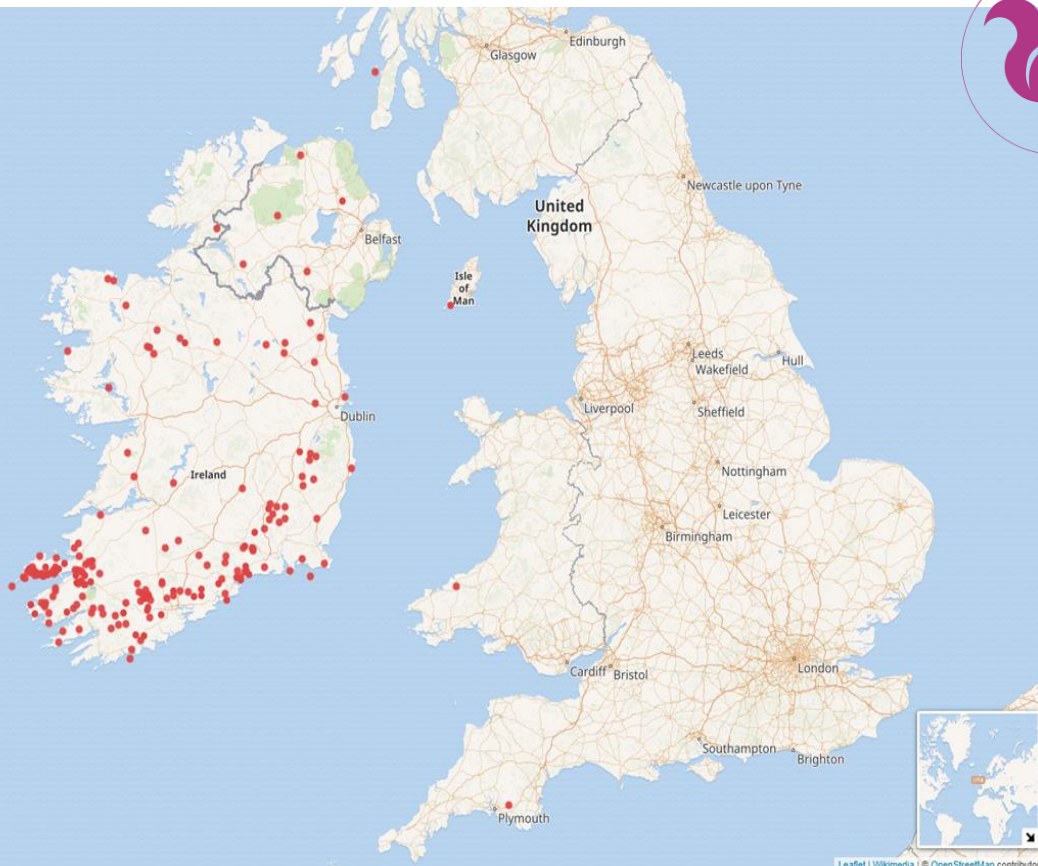
R.A.S. Macalister. Corpus inscriptionum insularum Celtaicarum, vol. I (1945)

CIIC 81 @ Stone Corridor University College Cork, No. 4

<https://www.wikidata.org/wiki/Q69385424>



<http://ogham.link>



Wikidata View

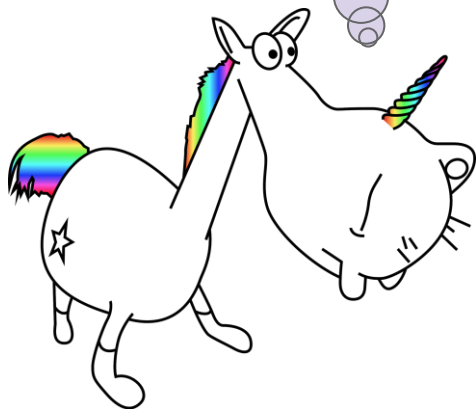
<https://w.wiki/HRe>

Wikidata Query Service

Leaflet | Wikimedia | © OpenStreetMap contributors




Which Ogham Stones can
be seen at UCC?



Wikidata Query Service

Examples Help More tools

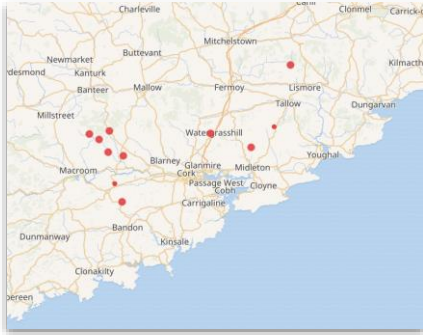
1 (Input a SPARQL query or choose a query example)

 **UCC** ?

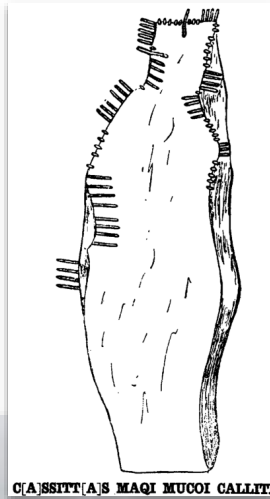
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh
ucc.ie

w.wiki/HRt

query.wikidata.org



<https://w.wiki/HRT>



C[A]SSITT[A]S MAQI MUCCI CALLITI



R.A.S. Macalister. *Corpus Inscriptionum Insularum Celticarum*. vol. I (1945)
UCC.Stone Corridor.Stone 4.CIIC.81.(Florian.Thiery).CC BY 4.0



[\(Florian Thiery\) CC BY 4.0](#)



SPARQL Unicorn Wikidata Plugin

Query: **Interlink** | **Enrich**

Select endpoint: Wikidata -> ?geo required! | Or: Load From File | layer name: unicorn_ | ogham_ucc

Layer concept: | Query Templates: Item+Label

Constraint By Area Type: | Area: | Constraint By BBOX

Valid Query

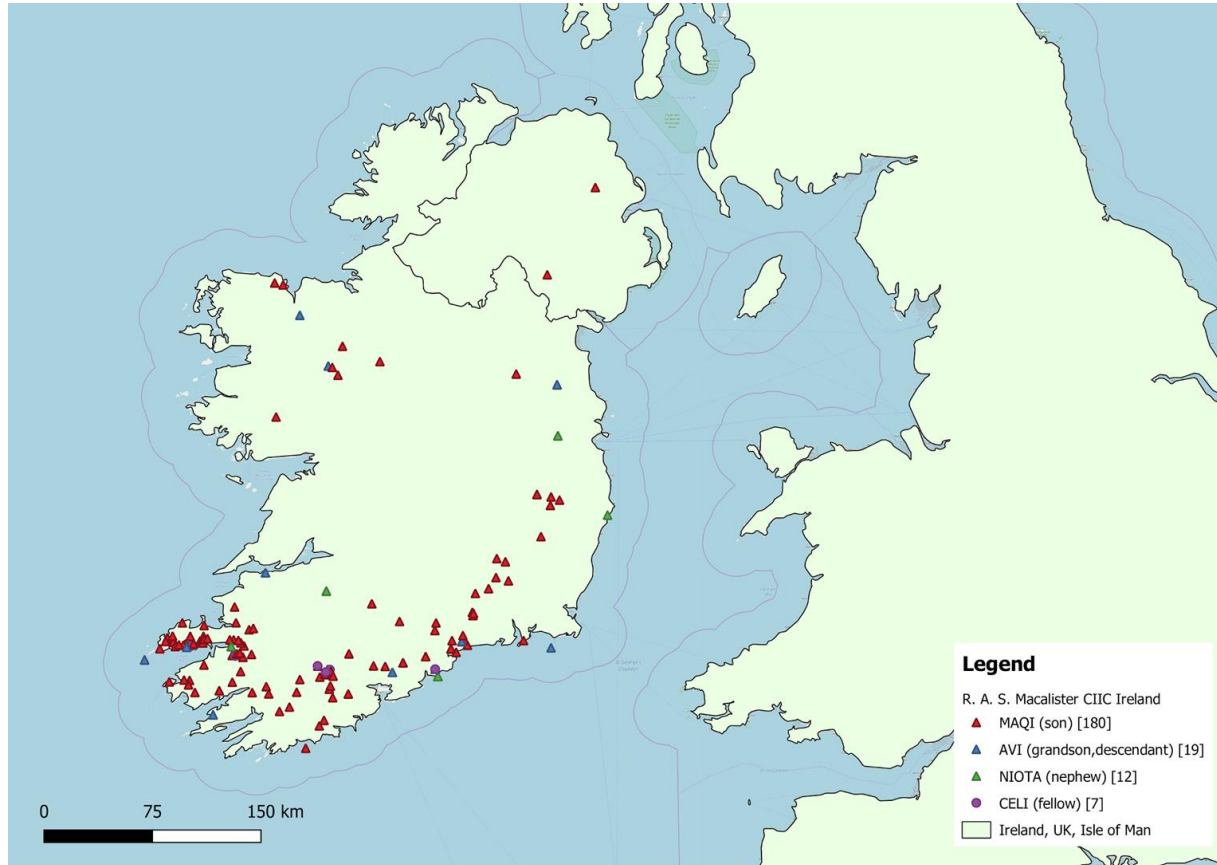
```
# Ogi Ogham Stones at UCC

SELECT ?label ?item ?geo ?country ?inscription WHERE {
  ?item wdt:P31 wd:Q2016147;
  wdt:P361 wd:Q70873595.
  OPTIONAL {
    ?item rdfs:label ?label.
    FILTER((LANG(?label)) = "en")
  }
  ?item wdt:P625 ?geo.
  OPTIONAL { ?item wdt:P17 ?countryWD. ?countryWD rdfs:label ?country.
  FILTER((LANG(?country)) = "en")}
  OPTIONAL { ?item wdt:P1684 ?inscription. }
  ?item wdt:P195 wd:Q69379477.
}
ORDER BY (?label)
```

add layer

load unicorn layers | unicorn_ogham_ucc | Export Loaded Layer as TTL | Schließen

Koordinate: -1115744,7013937 | Maßstab: 1:1549023 | Vergrößerung: 100% | Drehung: 0,0 ° | Zeichen | EPSG:3857





Thx!

Any questions?

Mail

rse@fthiery.de

Web

<http://squirrel.link>

<http://ogham.link>





Related Literature

- **Macalister, Robert Alexander Stewart. 1996.** *Corpus Inscriptionum Insularum Celticarum*. Celtic Studies. Kill Lane, Blackrock, Co. Dublin, Ireland ; Portland, OR: Four Courts Press.
- **Adrian Bielefeldt, Julius Gonsior, Markus Krötzsch. 2018.** *Practical Linked Data Access via SPARQL: The Case of Wikidata*. In Tim Berners-Lee, Sarven Capadisli, Stefan Dietze, Aidan Hogan, Krzysztof Janowicz, Jens Lehmann, eds., *Proceedings of the WWW/2018 Workshop on Linked Data on the Web (LDOW-18)*, volume 2073 of CEUR Workshop Proceedings, 2018. CEUR-WS.org.
 - <https://icclinf.tu-dresden.de/w/images/8/85/Wikidata-SPARQL-queries-Bielefeldt-Gonsior-Kroetzsch-LDOW-2018.pdf>



Credits

- title image by Wikimedia Foundation, Inc.
- presentation template by [SlidesCarnival](#)
- photos not referenced by [Pixabay](#)
or [Research Squirrel Engineers](#) [CC BY 4.0]



License



Except where otherwise noted, content on this presentation "SPARQLing Geodesy for Cultural Heritage: New Opportunities for Publishing and Analysing Volunteered Linked (Geo-)Data" is licensed under a **Creative Commons Attribution 4.0 International license**.