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## Acknowledgement

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# 1. Foreword

This document comprises a collection of Instagram carousels and posts produced by the OntoTrans communication and dissemination team. It accompanies the whitepaper “Social Media – the Art Nouveau of Communicating Research Projects to Citizens?” written by the same authors.

The carousels were produced using the Instagram post templates of the design platform Canva.<sup>1</sup> All artworks we used were royalty-free images and we obeyed the respective licenses of Canva<sup>2</sup>, pixabay<sup>3</sup>, Adobe Stock<sup>4</sup> and Shutterstock<sup>5</sup>.

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<sup>1</sup> <https://www.canva.com/>

<sup>2</sup> <https://www.canva.com/licensing-explained/>

<sup>3</sup> <https://pixabay.com/service/license-summary/>

<sup>4</sup> <https://stock.adobe.com/uk/license-terms>

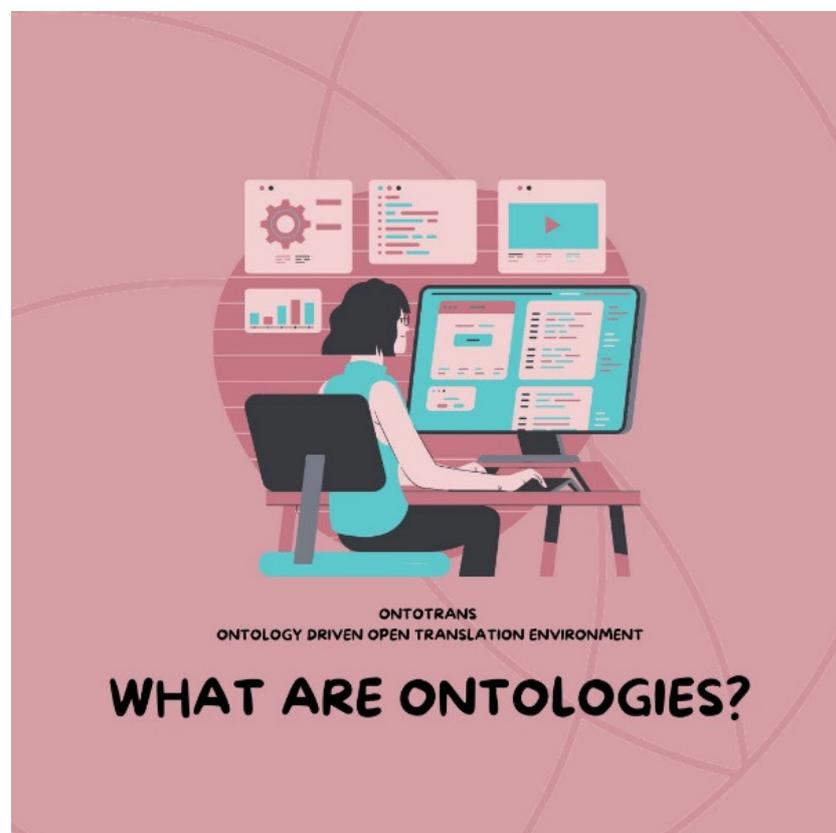
<sup>5</sup> [https://support.shutterstock.com/s/article/Standard-License-vs-Enhanced-License?language=en\\_US](https://support.shutterstock.com/s/article/Standard-License-vs-Enhanced-License?language=en_US)

## 2. Posts about Ontology

### 2.1. What are Ontologies?

Published on 23<sup>rd</sup> May 2022

Artworks by 09910190, Drawcee, Maxicons, sketchify, Sparklestroke Global, and Twemoji.



"An ontology is a formal,  
explicit specification  
of a shared  
conceptualization"



R. Studer, R. Benjamins, and D. Fensel. Knowledge engineering: Principles and methods. Data & Knowledge Engineering, 25(1-2):161-198, 1998.

## ... BUT WHAT DOES THAT EVEN MEAN?!

it is machine  
readable



different people  
do or view it  
the same way

"An ontology is a formal,  
explicit specification  
of a shared  
conceptualization"

concepts, properties,  
functions and basic  
principles have a clear  
definition

abstract model  
of a 'real thing'



# ONTOLOGIES HELP US TO PROVIDE MEANING FOR DATA



you can picture an ontology like a spiderweb



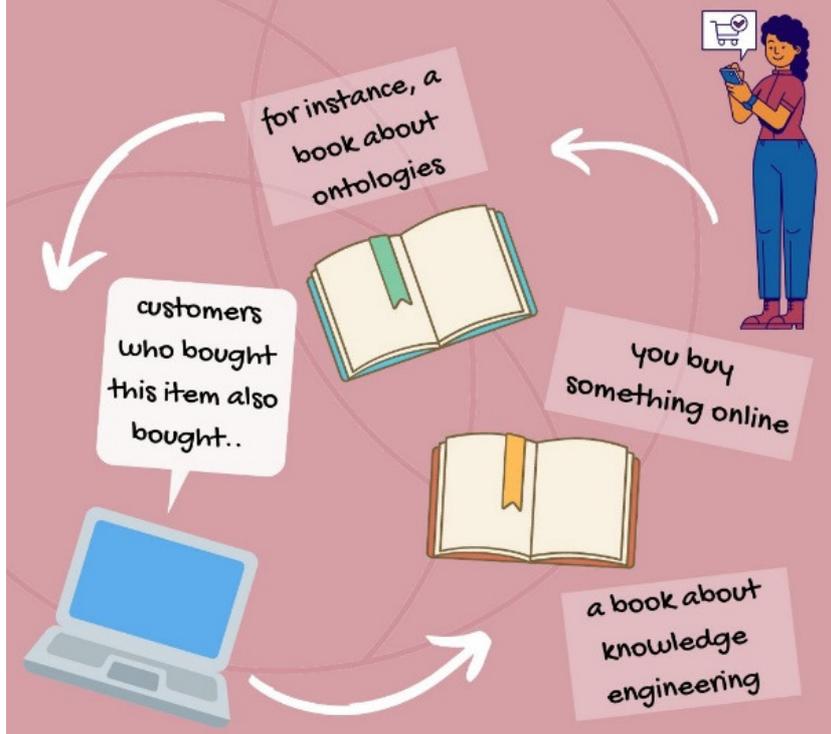
-> it connects various different information

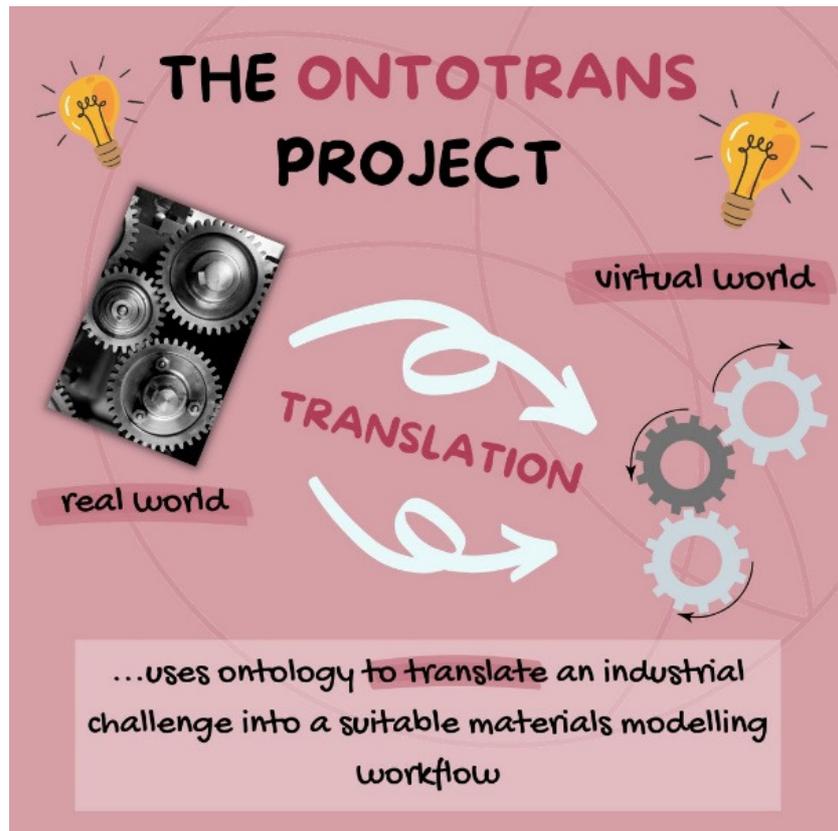
-> it allows the information to be understood by humans AND machines

-> can be used for many different subject areas

-> combines complex relations with complex concepts

## HERE'S AN EXAMPLE





## 2.2. Why do we use Ontologies?

Published on 27<sup>th</sup> May 2022

Artworks by Aficons studio, amethyststudio, iconsy, PorpuRi, ReaxionLab from pixabay, and sketchify.





## BENEFITS OF ONTOLOGIES

understanding relationships between entities  
-> eg. 'customers also bought...'

self-referencing to the same type of entity  
-> eg. HR relations, FOF, relations between data important

relationships of varying or unknown depth  
-> eg. supply chains: what happens to our product if we change supplier; plant: what happens if a pump stops working?

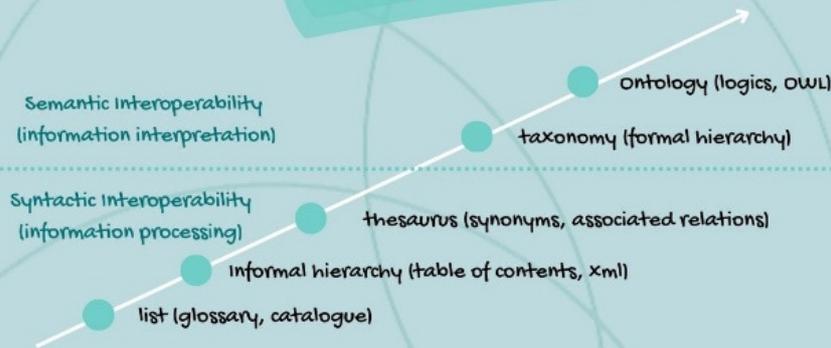
discovering different routes  
-> eg. logistics, route finders (road works, but you have to use roads; train tracks)



Lazarevic, Ljubica. Spotting a Graph Shaped problem. medium/geek culture. April 1, 2021. <https://medium.com/geekculture/spotting-a-graph-shaped-problem-b1f126bfec03>

# WE CAN USE ONTOLOGIES TO CREATE KNOWLEDGE

but, there is a catch!



We need semantics and metadata to make the data of our ontology understandable for machines AND humans -> interoperability

Oborst, Leo. The Ontology Spectrum. In: Pilo, Roberto, Healy, Michael, Kameas, Achilles. (2010). Theory and Applications of Ontology: Computer Applications. Springer, Neatherlands.

# HOW WE USE ONTOLOGIES IN ONTOTRANS

**SEMANTIC REPRESENTATION:** to represent a user case in all its relevant manufacturing and business aspects in an ontological form



**ONTOLOGY-BASED RECOMMENDATION SYSTEM (OntoRec):** to relate the user case representation to existing relevant data, materials modelling solutions & workflows

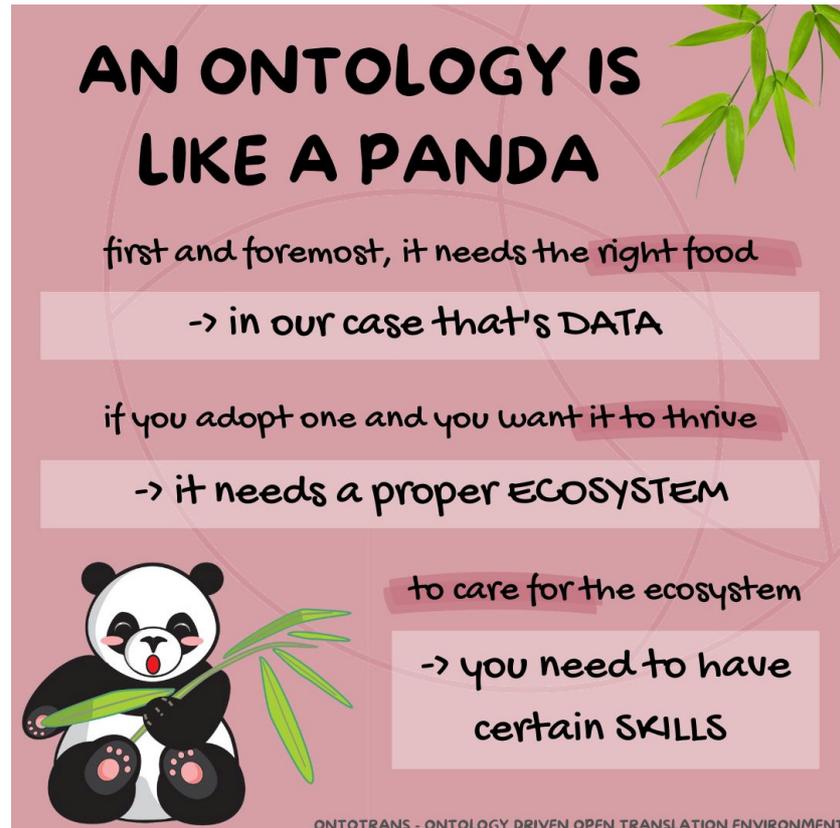
**ONTO-KNOWLEDGE-BASE (OntoKB):** to store all information managed in a knowledge-based RDF triplestore database and facilitate FAIR data management objectives



## 2.3. An Ontology is like a Panda

Published on 2<sup>nd</sup> June 2022

Artworks by Harvey Eichmann's images and Lunesse.

An infographic with a pink background and a faint circular pattern. It features a cartoon panda illustration on the left holding bamboo. The text is arranged in several boxes: a large title at the top, followed by a main point, a sub-point, another main point, a sub-point, and a final point. The text is in a casual, handwritten style.

**AN ONTOLOGY IS LIKE A PANDA**

first and foremost, it needs the right food  
-> in our case that's **DATA**

if you adopt one and you want it to thrive  
-> it needs a proper **ECOSYSTEM**

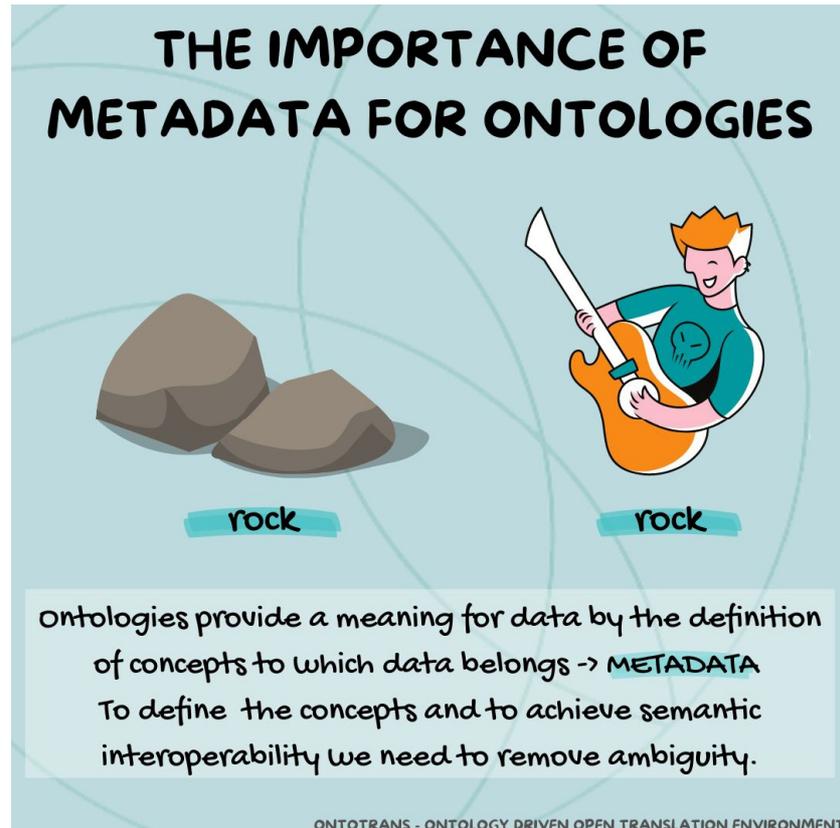
to care for the ecosystem  
-> you need to have certain **SKILLS**

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## 2.4. The Importance of Metadata for Ontologies

Published on 6<sup>th</sup> July 2022

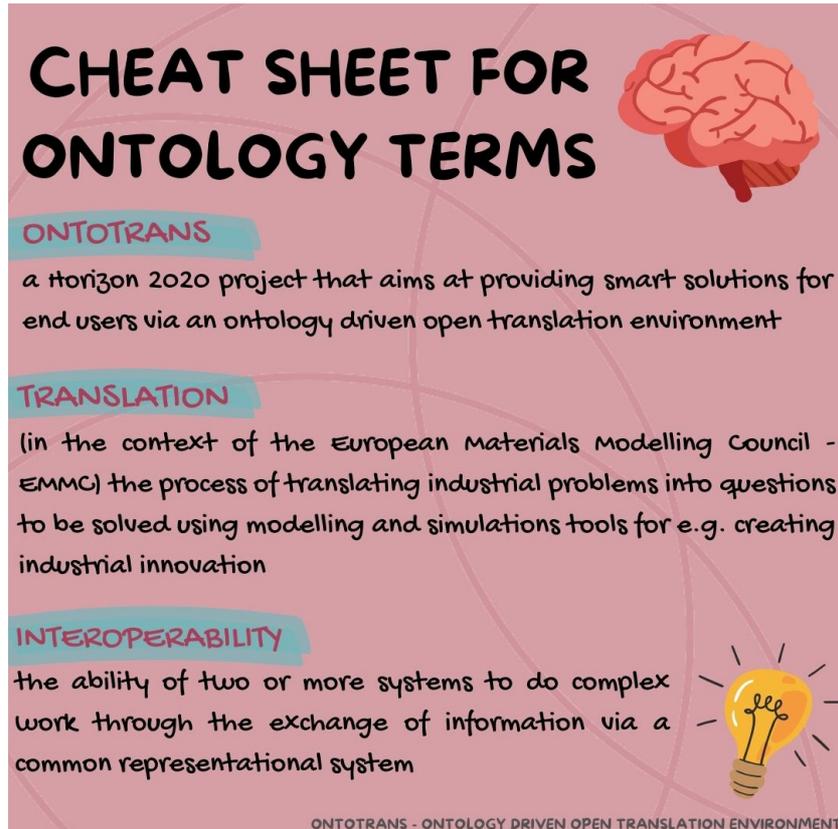
Artworks by OpenClipart-Vectors from pixabay and sketchify.

An infographic with a light blue background and faint circular patterns. At the top, the title "THE IMPORTANCE OF METADATA FOR ONTOLOGIES" is written in bold black letters. Below the title, there are two illustrations. On the left, two brown rocks are shown, with the word "rock" written in a blue box below them. On the right, a cartoon character with orange hair is playing an orange electric guitar, with the word "rock" written in a blue box below them. At the bottom, a white text box contains the following text: "Ontologies provide a meaning for data by the definition of concepts to which data belongs -> METADATA To define the concepts and to achieve semantic interoperability we need to remove ambiguity." At the very bottom, the text "ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT" is written in small letters.

## 2.5. Cheat Sheet

Published on 19<sup>th</sup> August 2022

Artworks by HtcHnm from pixabay and sketchify.

A cheat sheet titled "CHEAT SHEET FOR ONTOLOGY TERMS" with a brain illustration. It defines three terms: ONTOTRANS, TRANSLATION, and INTEROPERABILITY, each with a lightbulb illustration. The background is pink with faint geometric patterns.

# CHEAT SHEET FOR ONTOLOGY TERMS



### ONTOTRANS

a horizon 2020 project that aims at providing smart solutions for end users via an ontology driven open translation environment

### TRANSLATION

(in the context of the European Materials Modelling Council - EMMC) the process of translating industrial problems into questions to be solved using modelling and simulations tools for e.g. creating industrial innovation

### INTEROPERABILITY

the ability of two or more systems to do complex work through the exchange of information via a common representational system

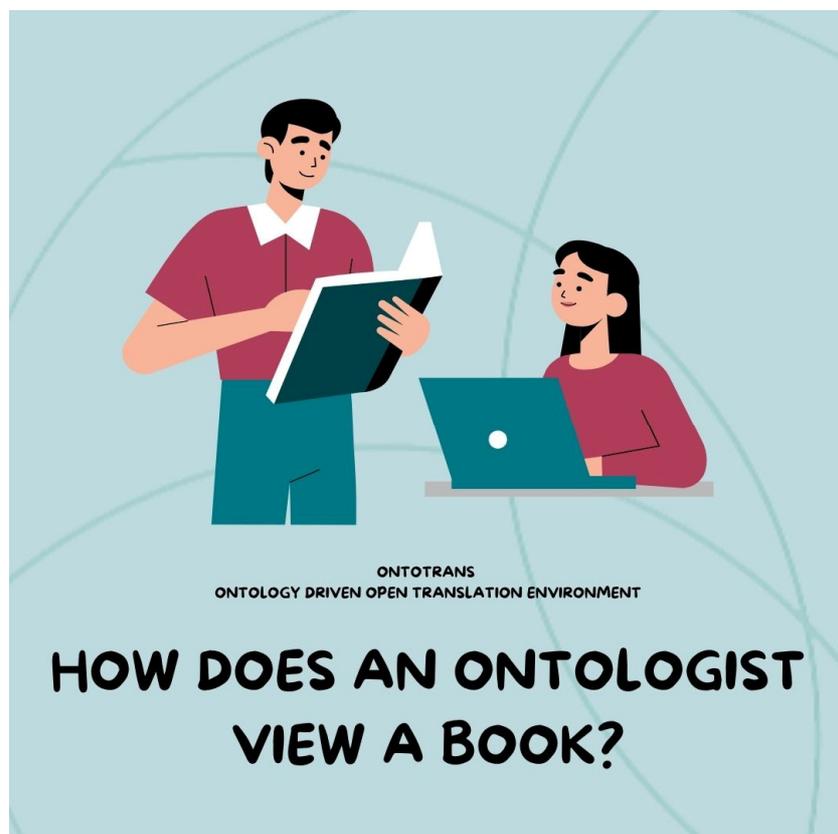


ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## 2.6. How does an Ontologist view a Book?

Published on 15<sup>th</sup> September 2022

Artworks by amethyststudio, Clker-Free-Vector-Images from pixabay, Iconsy, OpenClipart-Vectors from pixabay, rayagustioardi from pixabay, sparklestroke, and sketchify



## A BOOK CAN MEAN MANY THINGS TO DIFFERENT PEOPLE

There are no absolute definitions of the ontological nature of objects (such as books) - except for the definition of **the universe** and the single indivisible quantum elements of which it is made up.



## AN ONTOLOGIST'S MULTIPLE PERSPECTIVES OF A BOOK

**Physicalistic:** A solid which is an aggregate of organic and inorganic molecules

**Holistic/ Persistence:** A whole and an object

**Semiotics:** A sign that stands e.g. for the life of a person (a biography)

**Physicalistic/Reductionistic:** A hierarchy of physical entities: book -> pages -> paper -> fiber -> ...

**Symbolic/Reductionistic:** A hierarchy of book -> chapters -> paragraphs -> words -> symbols

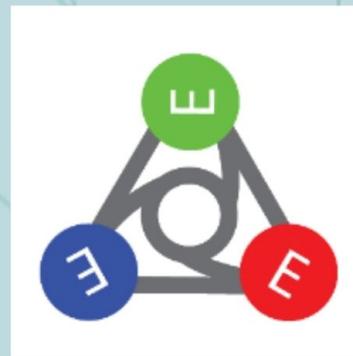


# FOR ONTOTRANS WE BRING IN THE EMMO

Elementary Multiperspective Material Ontology

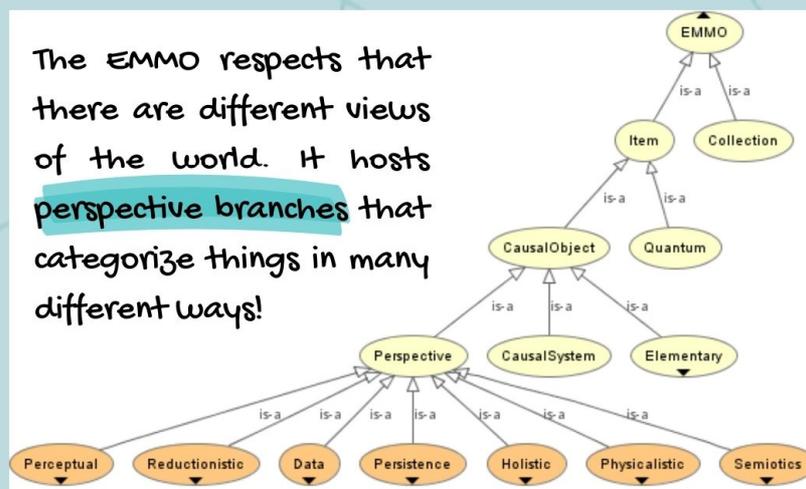
-> the EMMO is a semantic framework for the applied science

for more information about the EMMO look here: <https://github.com/emmo-repo/EMMO>



# THE EMMO HAS THE RIGHT BRANCHES

The EMMO respects that there are different views of the world. It hosts perspective branches that categorize things in many different ways!



## DIFFERENT DISCIPLINES AND ONTOTRANS

Different disciplines want to channel the interpretation of an entity towards a **specific domain** of interest. So if you're after ...

Bookbinding

Paper Material

Language

Content

Literature

Age

... our EMMO really supports your way of thinking!

## 2.7. What does “Ontology” mean?

Published on 23<sup>rd</sup> November 2022

Artworks by Dibujuante-10 from pixabay.

### WHAT DOES “ONTOLOGY” MEAN?

onto- (ὄντος,ontos, 'being' or 'that which is') and  
-logia (-λογία, 'logical discourse')

Ontology is the branch of philosophy that studies concepts  
such as existence, being, becoming, and reality.

The theologian and philosopher Anselm of Canterbury (11th  
century) wanted to proof the existence of God and made the  
ontological argument that God is  
“a being than which no greater can be conceived”

If it fails to exist, than a greater being  
than “a being than which no greater can  
be conceived” could exist -> absurd!  
Nothing can be greater than “a being  
than which no greater can be conceived”.  
So there is “a being than which no greater  
can be conceived”! -> God exists!



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## 2.8. What does “Ontology” mean to us?

Published on 9<sup>th</sup> January 2023

Artworks by 09910190, Mathilde Dare's Images, and sketchify.

An infographic titled "WHAT DOES 'ONTOLOGY' MEAN TO US?". It features a central definition: "An ontology is a formal, explicit specification of a shared conceptualization." Below this, four key characteristics are listed in light blue boxes, each with a corresponding icon: "formal: machine readable" (laptop), "explicit specification: concepts, properties, functions, axioms are explicitly defined" (stack of books), "shared: there is a community using it" (group of people), and "conceptualization: abstract model of some phenomena in the world" (gears). A small citation is visible: "R. Studer, R. Benjamins, and D. Fensel. Knowledge engineering: Principles and methods. Data & Knowledge Engineering, 25(1-2):161-198, 1998." The footer reads "ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT".

**WHAT DOES "ONTOLOGY" MEAN TO US?**

"An ontology is a formal, explicit specification of a shared conceptualization."

R. Studer, R. Benjamins, and D. Fensel. Knowledge engineering: Principles and methods. Data & Knowledge Engineering, 25(1-2):161-198, 1998.

**formal:** machine readable

**explicit specification:** concepts, properties, functions, axioms are explicitly defined

**shared:** there is a community using it

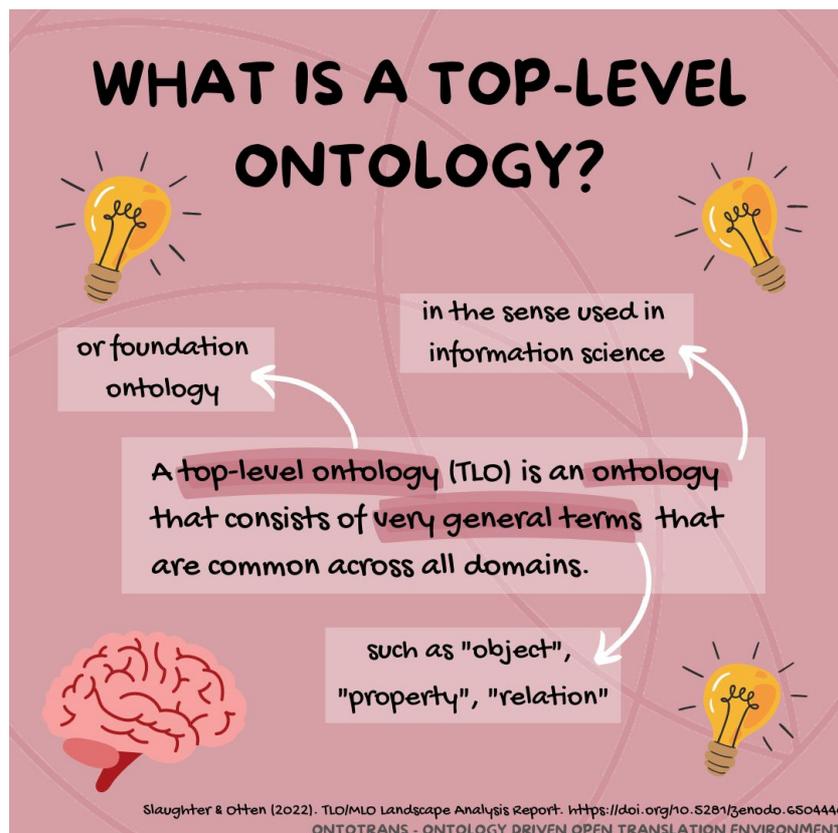
**conceptualization:** abstract model of some phenomena in the world

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## 2.9. What is a TOP-level Ontology?

Published on 17<sup>th</sup> May 2023

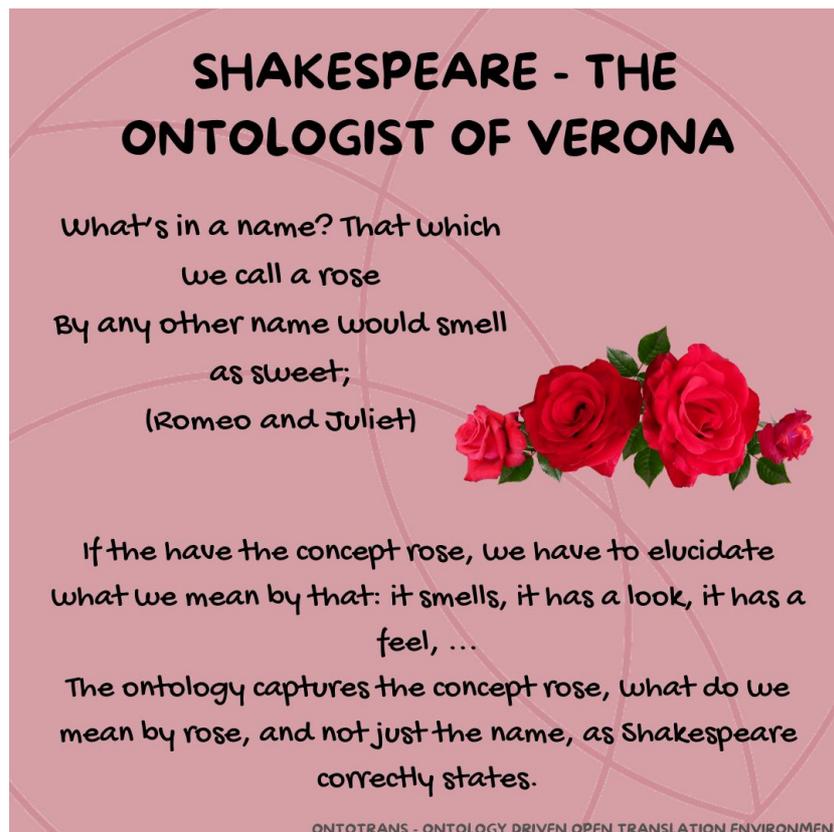
Artworks by sketchify and sparklestroke.



## 2.10. Shakespeare - The Ontologist of Verona

Published on 19<sup>th</sup> May 2023

Artworks by Buntysmum from pixabay.

A graphic with a pink background and faint geometric lines. It contains text and a cluster of red roses. The text discusses the concept of a rose and the role of ontology in capturing its meaning.

**SHAKESPEARE - THE  
ONTOLOGIST OF VERONA**

What's in a name? That which  
we call a rose  
By any other name would smell  
as sweet;  
(Romeo and Juliet)

A cluster of five vibrant red roses with green leaves, positioned to the right of the Shakespeare quote.

If we have the concept rose, we have to elucidate  
what we mean by that: it smells, it has a look, it has a  
feel, ...

The ontology captures the concept rose, what do we  
mean by rose, and not just the name, as Shakespeare  
correctly states.

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## 2.11. Who should bring Ontologies to your Organisation?

Published on 2<sup>nd</sup> June 2023

Artworks by sketchify.

An infographic with a pink background and a faint geometric pattern. At the top, the title "WHO SHOULD BRING ONTOLOGIES TO YOUR ORGANISATION?" is written in bold black letters. Below the title, there are three main sections. The first section is titled "The Modellers?" and features an illustration of a woman with red hair talking on a phone while sitting at a desk with a laptop. The second section is titled "The IT-Staff?" and features an illustration of a woman with dark hair sitting at a desk with a laptop and a coffee cup. Between these two sections, there is a paragraph of text. The third section is titled "Computer and Data scientists!" and features an illustration of a woman with dark hair sitting at a desk with a laptop. At the bottom of the infographic, there is a small line of text: "ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT".

**WHO SHOULD BRING ONTOLOGIES TO YOUR ORGANISATION?**

**The Modellers?**

**The IT-Staff?**

They may well have experience with ontologies and semantics, but working with ontologies is a fulltime job; changing the job spec can be an option ("up-skill").

**Computer and Data scientists!**

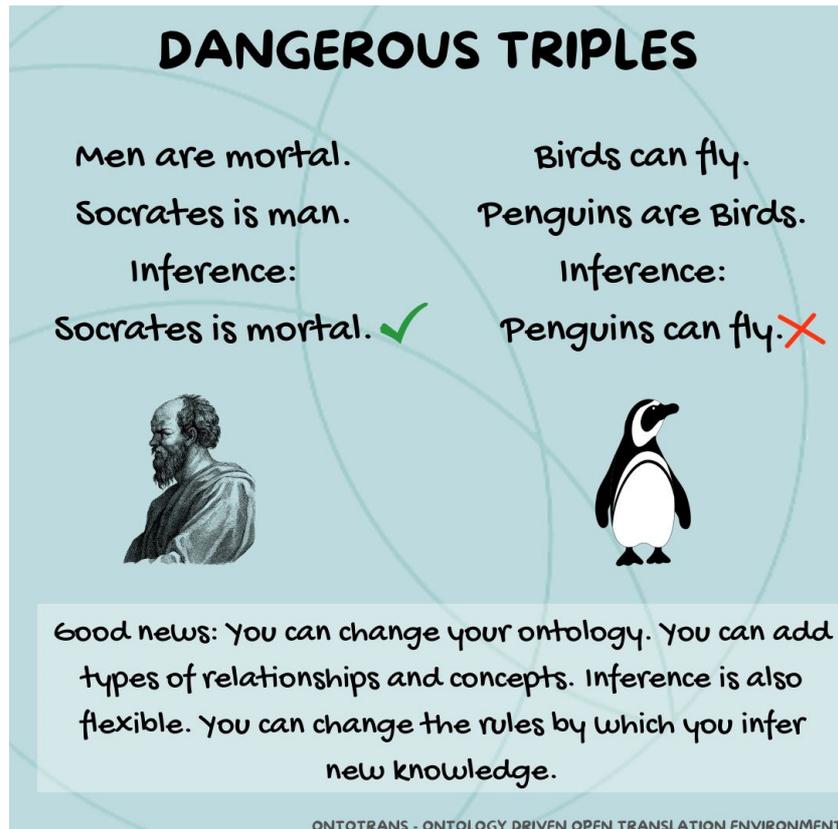
That's the way to go if you want to work with Ontologies in your organisation!

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## 2.12. Dangerous Triples

Published on 23<sup>rd</sup> June 2023

Artworks by Clker-Free-Vector-Images from pixabay and GDJ from pixabay.

An infographic titled "DANGEROUS TRIPLES" comparing logical inference. It shows two columns of text. The left column shows a valid inference: "Men are mortal. Socrates is man. Inference: Socrates is mortal." with a green checkmark and an illustration of Socrates. The right column shows an invalid inference: "Birds can fly. Penguins are Birds. Inference: Penguins can fly." with a red X and an illustration of a penguin. A text box at the bottom explains that ontology can be changed and inference rules can be modified.

**DANGEROUS TRIPLES**

Men are mortal.  
Socrates is man.  
Inference:  
Socrates is mortal. ✓

Birds can fly.  
Penguins are Birds.  
Inference:  
Penguins can fly. ✗

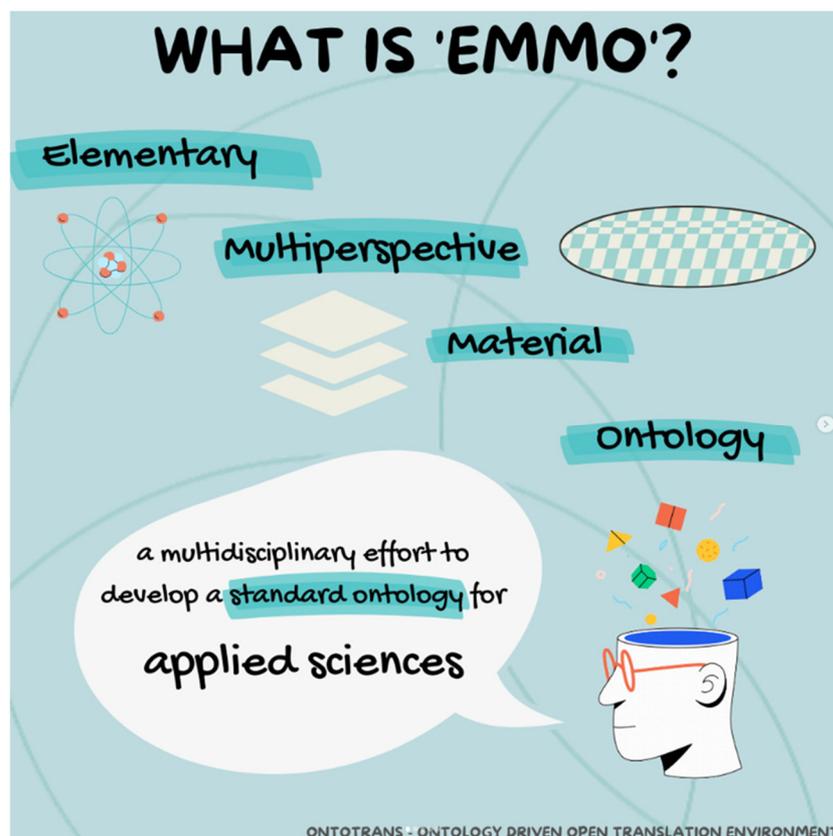
Good news: You can change your ontology. You can add types of relationships and concepts. Inference is also flexible. You can change the rules by which you infer new knowledge.

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## 2.13. What is EMMO?

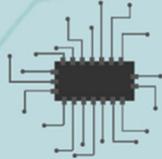
Published on 25<sup>th</sup> August 2023

Artworks by Eucalyp, Fusion Books, GDJ from pixabay, Rizkreativ, sinisamaric1 from pixabay, and xnimrodX.



## WHAT IS 'EMMO' BASED ON?

ICT



ANALYTICAL  
PHILOSOPHY

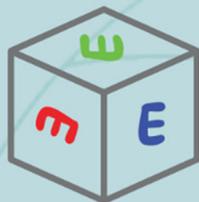
PHYSICS



It has been instigated by materials science to provide a framework for knowledge capture that is consistent with scientific principles and methodologies.

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

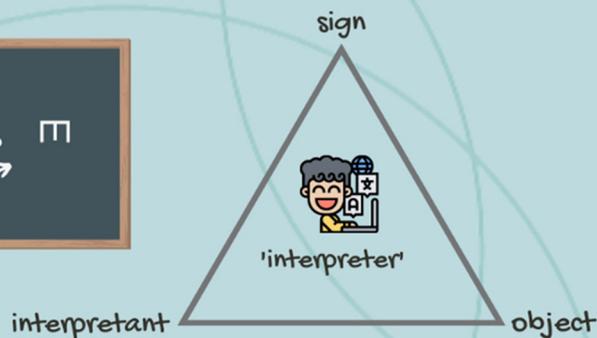
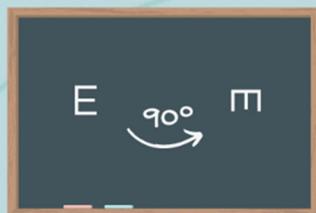
## WHAT DOES THE LOGO REPRESENT?



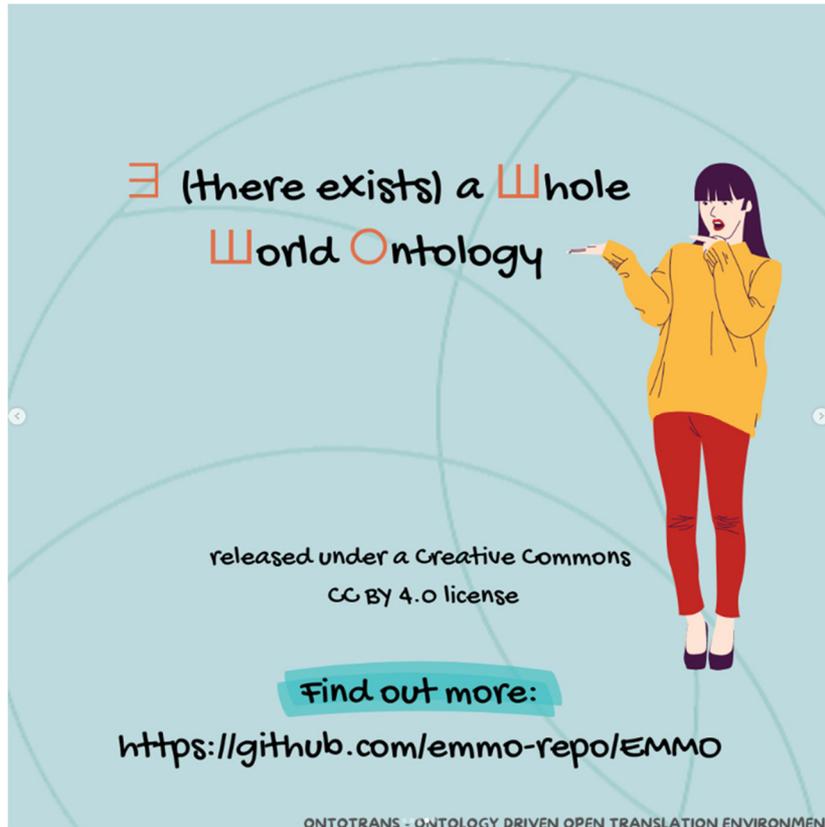
multiple perspectives



Peirce's semiotics



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A presentation slide with a light blue background and a faint globe graphic. The text is arranged as follows:

☰ (there exists) a Whole  
World Ontology

released under a Creative Commons  
CC BY 4.0 license

Find out more:  
<https://github.com/emmo-repo/EMMO>

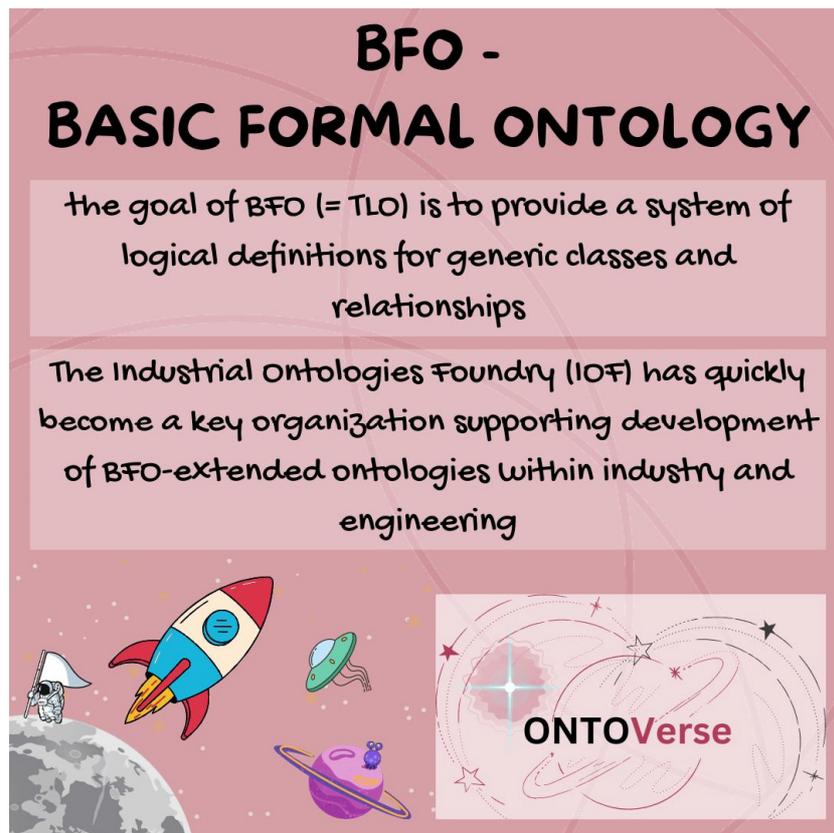
ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

The slide also features an illustration of a woman with dark hair, wearing a yellow sweater and red pants, pointing towards the text.

## 2.14. BFO - Basic Formal Ontology

Published on 12<sup>th</sup> September 2023

Artworks by amethyststudio, Clker-Free-Vector-Images from pixabay, iconsy, OpenClipart-Vectors from pixabay, rayagustioardi from pixabay, sketchify, and zzzvector from pixabay.

An infographic titled "BFO - BASIC FORMAL ONTOLOGY" with a pink background. It contains two text boxes and a space-themed illustration. The first text box states: "the goal of BFO (= TLO) is to provide a system of logical definitions for generic classes and relationships". The second text box states: "The Industrial Ontologies Foundry (IOF) has quickly become a key organization supporting development of BFO-extended ontologies within industry and engineering". The illustration at the bottom features a rocket, a satellite, a planet, and a satellite dish, with a central box labeled "ONTOVerse" surrounded by orbital paths and stars.

**BFO -  
BASIC FORMAL ONTOLOGY**

the goal of BFO (= TLO) is to provide a system of logical definitions for generic classes and relationships

The Industrial Ontologies Foundry (IOF) has quickly become a key organization supporting development of BFO-extended ontologies within industry and engineering

**ONTOVerse**



More recently, BFO has also become an ISO standard.

BFO was adopted to be the top-level ontology of IOF, an ecosystem of ontology resources designed to promote interoperability in digital manufacturing and related fields.



<https://basic-formal-ontology.org/>

Slaughter & Otten (2022). TLO/MLO Landscape Analysis Report.

<https://doi.org/10.5281/zenodo.6504440>

## 2.15. ONTOChef

Published on 19<sup>th</sup> September 2023

Artworks from Bomsymbols, Clker-Free-Vector-Images from pixabay, Drawcee, OpenClipart-Vectors from pixabay, Riskawatiusman, Rita Juwita, sketchify, and Twemoji.





Recipe  
Reductionistic boiled egg

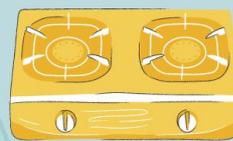


Decompose the process of boiling an egg (the "whole") into steps that are causally connected in space and time. The process can be fully characterised in terms of any known or observed physical quantities such as the mass of the objects, their temperature throughout the process, the inertia moment of the egg before and after being boiled, etc.

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Recipe  
Reductionistic boiled egg



ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT



**ONTO**Chef

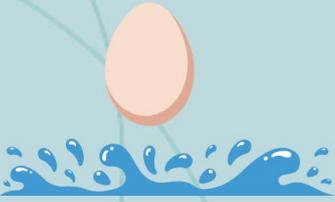
### Recipe

## Reductionistic boiled egg

 soft-boiled 4-5 minutes, medium-boiled 6-7 minutes, hard-boiled 8-9 minutes  
(you may fail ...)

set a timer

 use spoon to rescue egg from hot water

 cool your egg  
peel your egg  
enjoy your egg



ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

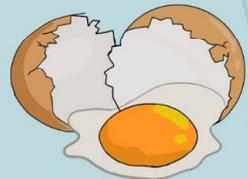


**ONTO**Chef

### Recipe

## Physicalistic boiled egg

We look at the egg as a complex material.

 cracked open for illustrative purposes

The egg is encased in a solid crust made of an inorganic salt embedded in an organic matrix.

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT



Recipe  
Physicalistic boiled egg

Boiling the egg then transforms the microscopic structure of the proteins in the egg's white and yolk, turning them from a gel to a solid.

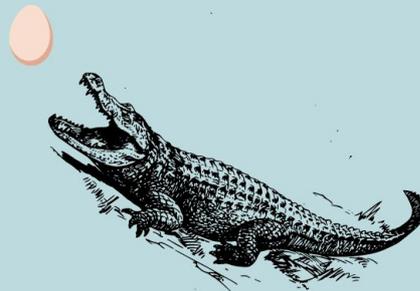


ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT



Bonus Recipe  
Holistic Egg

Eggs are food, just eat ...



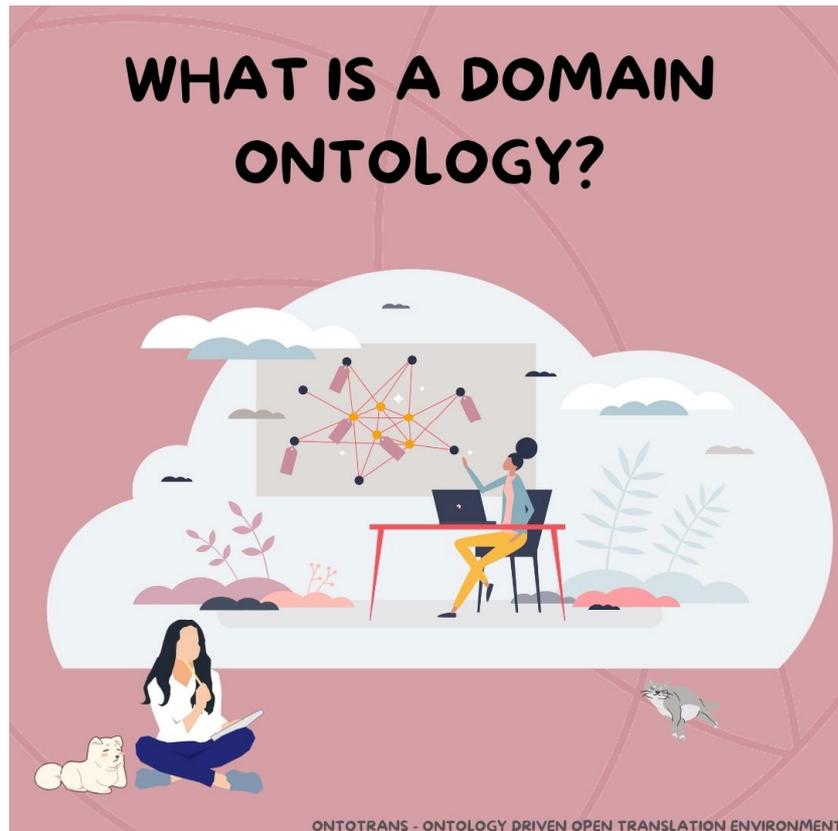
Thanks to our MasterChef Otello M. Roscioni  
<https://materialsmodelling.com/how-to-boil-an-egg>

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## 2.16. What is a Domain Ontology?

Published on 26<sup>th</sup> September 2023

Artworks by Adobe Stock, Drawcee, sketchify, Vectorium, and Wizard Studio's Images.



Domain ontologies describe objects, events, and relationships that are of interest to specific knowledge domains



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### MaterialsMine

A materials ontology to support publication and exploration of data involving nanomaterials and metamaterials.

### CHAMEO

A domain ontology for materials characterisation



### Biological Imaging Methods Ontology

A structured vocabulary of sample preparation, visualization, and imaging methods used in biomedical research.



ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

A promotional graphic for the OntoTrans project. It features a woman in a blue suit holding a globe, a speech bubble asking "Do you use or know any domain ontologies?", the ONTOTRANS logo, the text "Ontology driven Open Translation Environment", social media icons for LinkedIn, Instagram, and Twitter, and a small text box at the bottom right mentioning funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 862136.

Do you use or know any domain ontologies?

**ONTOTRANS**

Ontology driven Open Translation Environment

for more information visit [ontotrans.eu](https://ontotrans.eu)  
or follow our social media channels

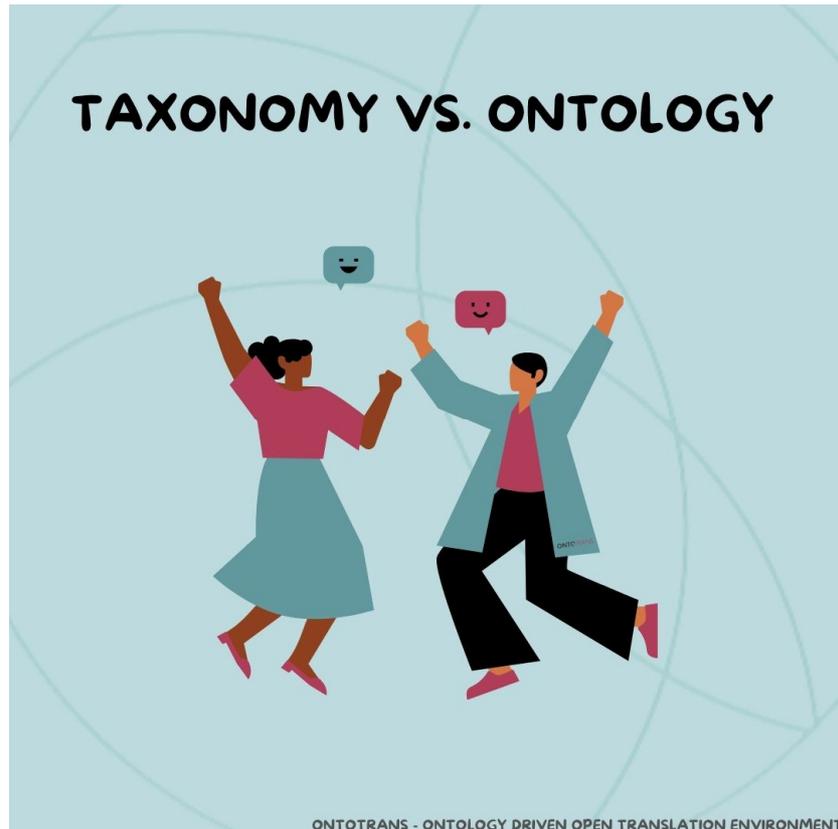
  

 The OntoTrans Project received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 862136

## 2.17. Taxonomy vs. Ontology

Published on 13<sup>th</sup> October 2023

Artworks by Adobe stock, amethyststudio, Fannan Studio, Fusion Books, Gambar, hannahlouise123 from pixabay, iconsy, Procrea RosZie from pixabay, Rima Riani, sketchify, Sketchify Education, sparklestroke, and venicedesigns.



## What is 'Taxonomy'?

Imagine taxonomy as a tree with branches



It refers to a Parent-Child relation

"is\_a"



Taxonomy = a hierarchy of (simple) concepts

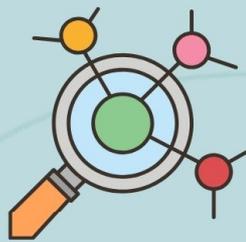


and is generally limited to a specific subject area

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## Why do we need taxonomies?

Taxonomy organises and classifies data for analysis



For example, to understand a text through classification



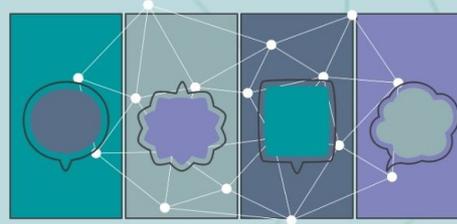
## What about ontology?

Ontology is more like a SPIDERWEB

- A manifold of relations
- Not limited to a specific subject area



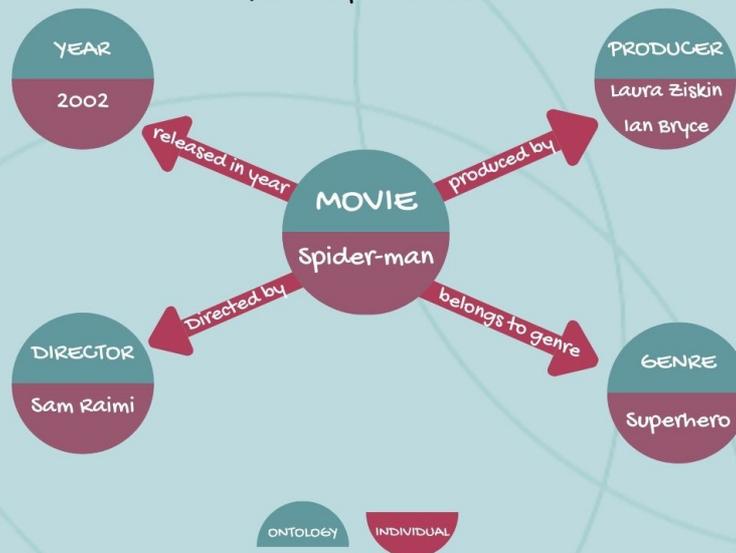
It depicts complex relations with complex concepts



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## Why do we need ontologies?

An ontology is a formal representation of a knowledge domain, for example, movies.



INSPIRED BY: [HTTPS://WWW.YOUTUBE.COM/WATCH?V=5PKDIDGELBA](https://www.youtube.com/watch?v=5PKDIDGELBA)

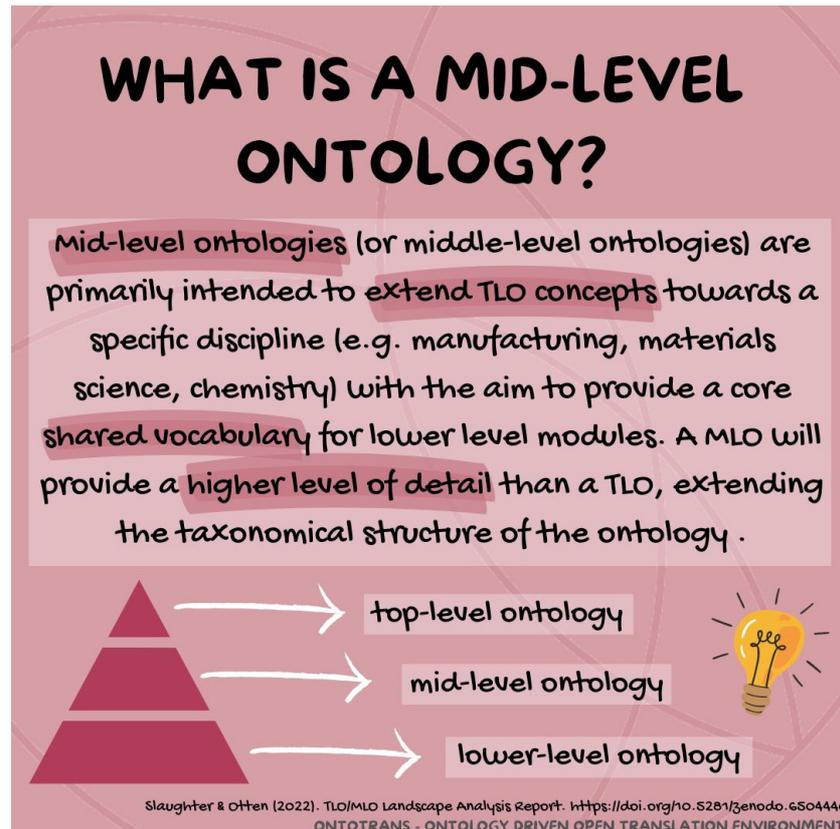
Now a computer can also "understand" what we know about movies.



## 2.18. What is a Mid-level Ontology?

Published on 19<sup>th</sup> October 2023

Artworks by sketchify.

The infographic is set against a light pink background with faint geometric patterns. At the top, the title "WHAT IS A MID-LEVEL ONTOLOGY?" is written in large, bold, black capital letters. Below the title, a text box contains the following text: "Mid-level ontologies (or middle-level ontologies) are primarily intended to extend TLO concepts towards a specific discipline (e.g. manufacturing, materials science, chemistry) with the aim to provide a core shared vocabulary for lower level modules. A MLO will provide a higher level of detail than a TLO, extending the taxonomical structure of the ontology." Below this text, a diagram shows a three-tiered pyramid on the left. Three white arrows point from the pyramid's levels to three text boxes on the right: "top-level ontology" (top), "mid-level ontology" (middle), and "lower-level ontology" (bottom). To the right of the middle and bottom boxes is a yellow lightbulb icon with radiating lines, symbolizing an idea or insight. At the bottom of the infographic, there is a small line of text: "Slaughter & Otten (2022). TLO/MLO Landscape Analysis Report: <https://doi.org/10.5281/zenodo.6504440> ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT".

**WHAT IS A MID-LEVEL ONTOLOGY?**

Mid-level ontologies (or middle-level ontologies) are primarily intended to extend TLO concepts towards a specific discipline (e.g. manufacturing, materials science, chemistry) with the aim to provide a core shared vocabulary for lower level modules. A MLO will provide a higher level of detail than a TLO, extending the taxonomical structure of the ontology .

top-level ontology

mid-level ontology

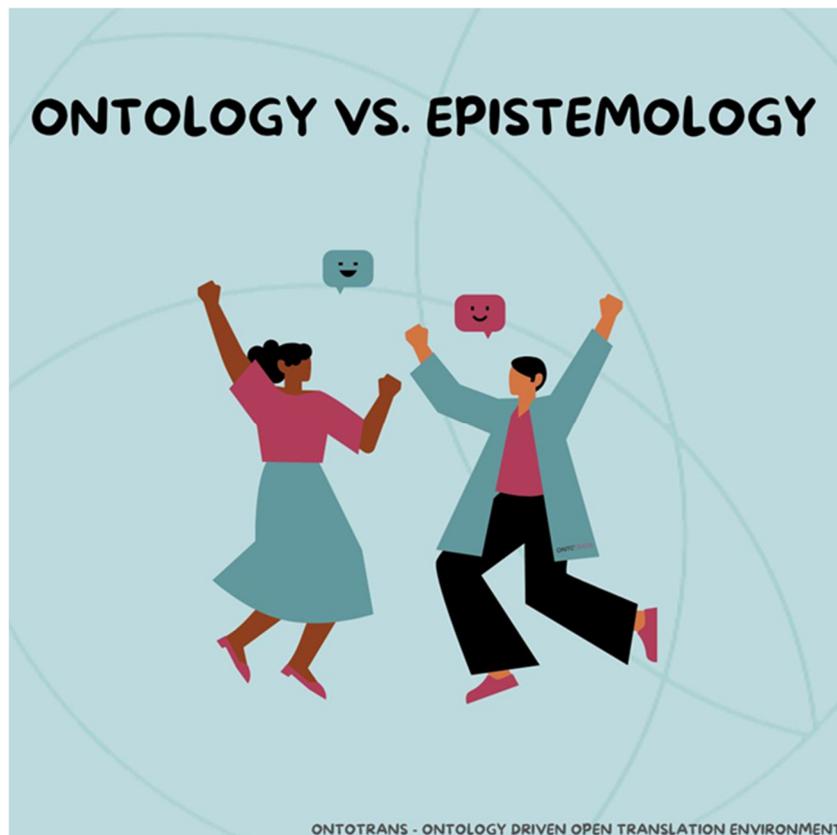
lower-level ontology

Slaughter & Otten (2022). TLO/MLO Landscape Analysis Report: <https://doi.org/10.5281/zenodo.6504440>  
ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## 2.19. Ontology vs. Epistemology

Published on 10<sup>th</sup> November 2023

Artworks by amethyststudio, Clker-Free-Vector-Images from pixabay, EMBASY, iconsy, Lohrelei from pixabay, Maddie Red, OpenClipart-Vectors from pixabay, sketchify, sparklestroke. and Unfold X.



# ONTOLOGY

the philosophical study of being



An ontologist wants to understand whether things exist or don't exist.

as soon as they know they exist, they start *cat-egorising*



# EPISTEMOLOGY

the branch of philosophy concerned with knowledge.



How do we know that cats exist?



We have seen them.

We own one.

We have read about them.



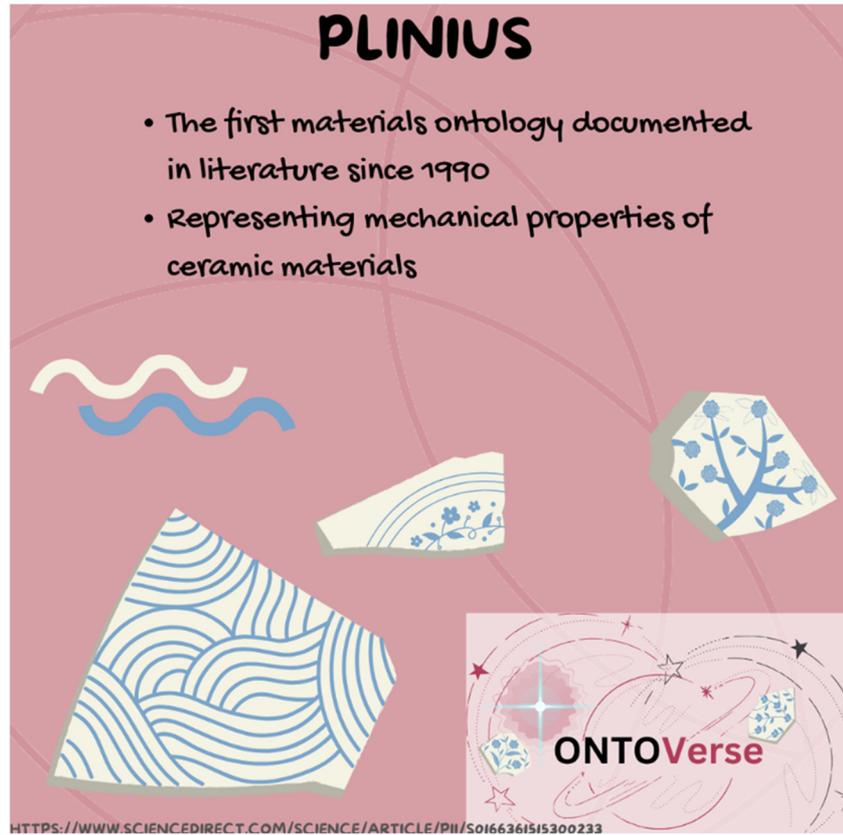
All of the above must make us believe that cats exist.

Then we gained the knowledge about cats.

## 2.20. Plinius

Published on 25<sup>th</sup> November 2023

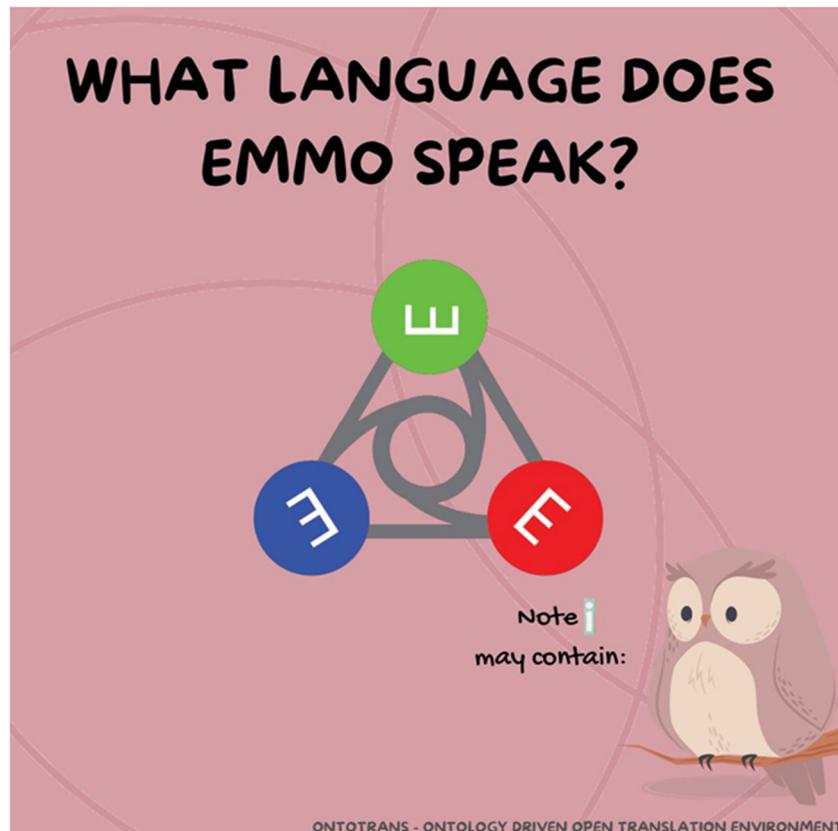
Artworks by Sketchify Education and Sketchify Spain.



## 2.21. What Language does EMMO Speak?

Published on 23rd February 2024

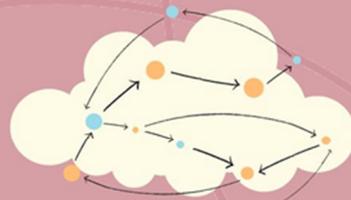
Artworks by Atdaographic, MW's Images, sketchify, Sketchify Italy, and sparklestroke.



# OWL

## WEB ONTOLOGY LANGUAGE

EMMO speaks OWL which describes semantic relationships:



- CLASSES
- PROPERTIES
- INDIVIDUALS
- DATA VALUES

In fact, EMMO speaks **OWL DL** (description logic) to provide the maximum expressiveness while retaining computational completeness;

It includes restrictions such as type separation (e.g., a class cannot be an individual or property, a property can not be an individual or class, ...)

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## HOW DOES OWL LOOK LIKE?

Here is an example of how OWL would describe chicken topping on a pizza

```
<!-- http://www.co-ode.org/ontologies/pizza/pizza.owl#ChickenTopping -->
<owl:Class rdf:about="http://www.co-ode.org/ontologies/pizza/pizza.owl#ChickenTopping">
  <rdfs:subClassOf rdf:resource="http://www.co-ode.org/ontologies/pizza/pizza.owl#MeatTopping"/>
  <rdfs:subClassOf>
    <owl:Restriction>
      <owl:onProperty rdf:resource="http://www.co-ode.org/ontologies/pizza/pizza.owl#hasSpiciness"/>
      <owl:someValuesFrom rdf:resource="http://www.co-ode.org/ontologies/pizza/pizza.owl#Mild"/>
    </owl:Restriction>
  </rdfs:subClassOf>
  <rdfs:label xml:lang="en">ChickenTopping</rdfs:label>
  <rdfs:label xml:lang="pt">CoberturaDeFrango</rdfs:label>
  <skos:prefLabel xml:lang="en">Chicken</skos:prefLabel>
</owl:Class>
```



<https://protege.stanford.edu/ontologies/pizza/pizza.owl>

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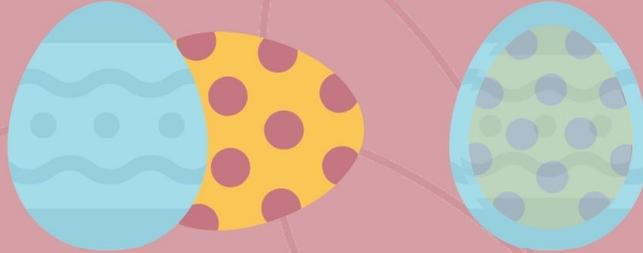
## 2.22. Mereological Relations for Easter

Published on 1<sup>st</sup> April 2024

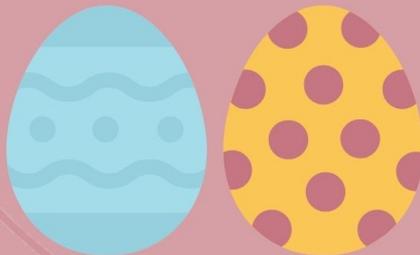
Artworks by Canva Layouts and Eduardo Chaves.



overlapping - expressed by the Object Relation -  
**:isoverlapping**, applies between two entities  
intersecting each other.



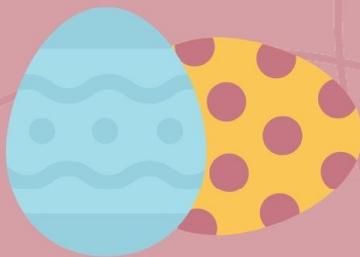
 :isoverlapping 



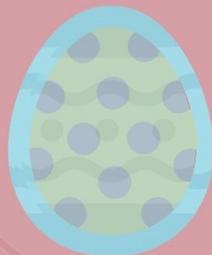
 :isNotoverlapping 

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

An overlap is an overcrossing when there is a  
 partial overlap, or a parthood when there is a  
 total overlap of one entity on the other.



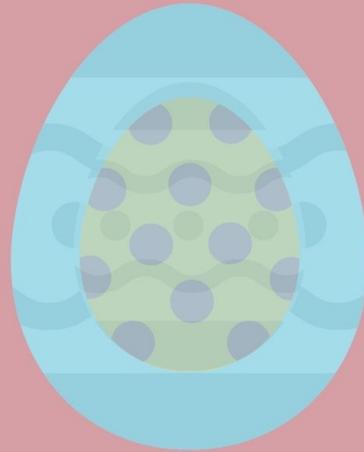
 :isOvercrossing 



 :hasPart 

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A part is called proper part when there is a part of the whole that is not overlapped by it.



 :hasProperPart 

<https://github.com/emmo-repo/EMMO/wiki/Mereocausality>

Happy Easter to all  
who celebrate!



Ontology driven Open Translation Environment

for more information visit [ontotrans.eu](http://ontotrans.eu)  
or follow our social media channels



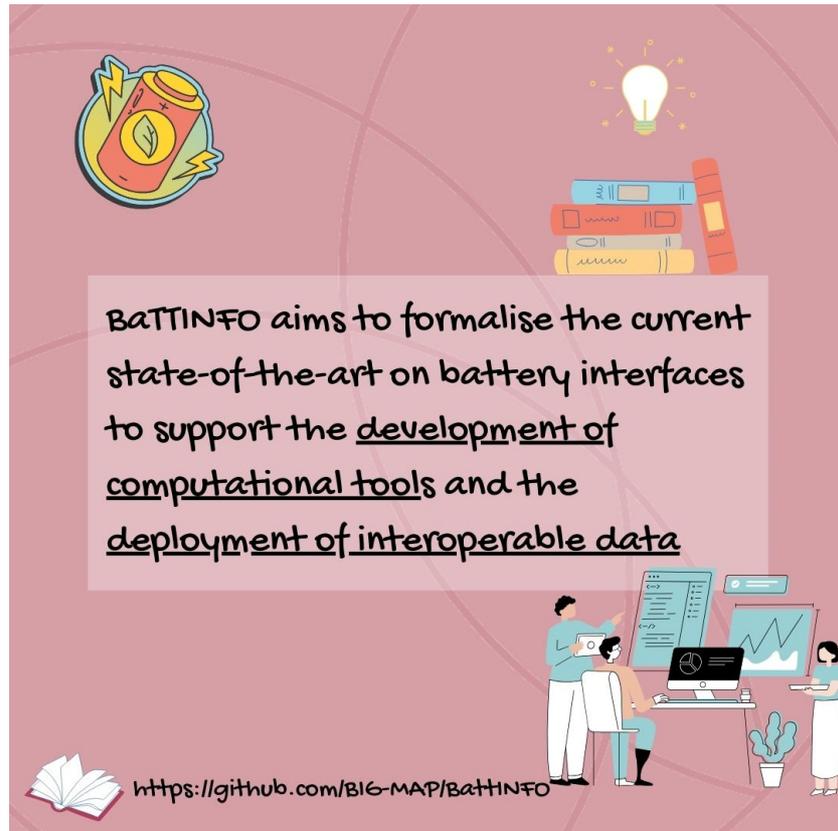
## 2.23. BattINFO - Battery Interface Ontology

Published on 30<sup>th</sup> April 2024

Artworks by iconsy, sketchify, Surakit, and Trendify

Logos by <https://battery2030.eu/battery2030/projects/big-map/>

A promotional poster for BattINFO. At the top left is an illustration of two batteries, one orange and one green. The main title "BATTINFO - BATTERY INTERFACE ONTOLOGY" is in large, bold, black letters. Below it, a light pink box contains the text "a common battery language to support data interoperability in battery research". Another light pink box below that says "Based on the top-level EMMO, it was developed for the projects BIG-MAP and BATTERY 2030+". To the right of this text is the BIG-MAP logo, which is a green circle with a battery icon and the text "BIG-MAP". At the bottom left is the ONTOVerse logo, featuring a stylized galaxy with the text "ONTOVerse". At the bottom right is the BATTERY 2030+ logo, which is a blue square with "BATTERY" in white and "2030+" in green, next to an illustration of a solar panel and a battery.

A large illustration with a red background. At the top left is a battery icon with a lightning bolt. At the top right is a lightbulb icon. Below the lightbulb are several books. In the center, a white text box contains the project description. At the bottom right, there is an illustration of three people working at a computer workstation. At the bottom left, there is an open book icon and a URL.

BATTINFO aims to formalise the current state-of-the-art on battery interfaces to support the development of computational tools and the deployment of interoperable data

 <https://github.com/BIG-MAP/BattINFO>



## 3. Posts about OntoTrans

### 3.1. What is OntoTrans?

Published on 2<sup>nd</sup> January 2023

Artworks by Clker-Free-Vector-Images from pixabay, iconsy, nhorphai, OpenClipart-Vectors by pixabay, sketchify, Sketchify Education, and Wanicon.



## WHAT IS ONTOTRANS?

OntoTrans is an ontology - based OPEN TRANSLATION ENVIRONMENT (OTE) that will support industry in solving their innovation challenges more efficiently by providing access to relevant information and efficient use of materials modelling.



## HOW DOES ONTOTRANS DO THAT?

1) At the beginning, it all starts with an innovation challenge. In the first step, OntoTrans defines the challenge as an innovation case, i.e., the specific process we wish to improve.



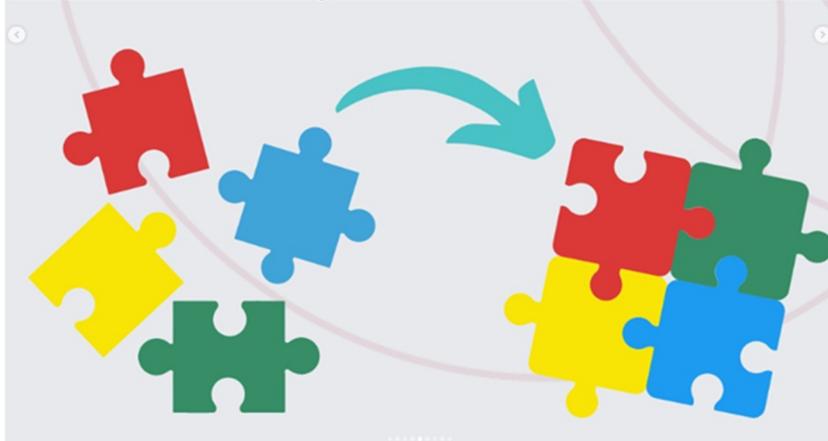
## HOW DOES ONTOTRANS DO THAT?

2) OntoTrans then represents the innovation case in a standard ontological form. This means that all the relevant concepts of the innovation case and how they relate to each other are taken into account.



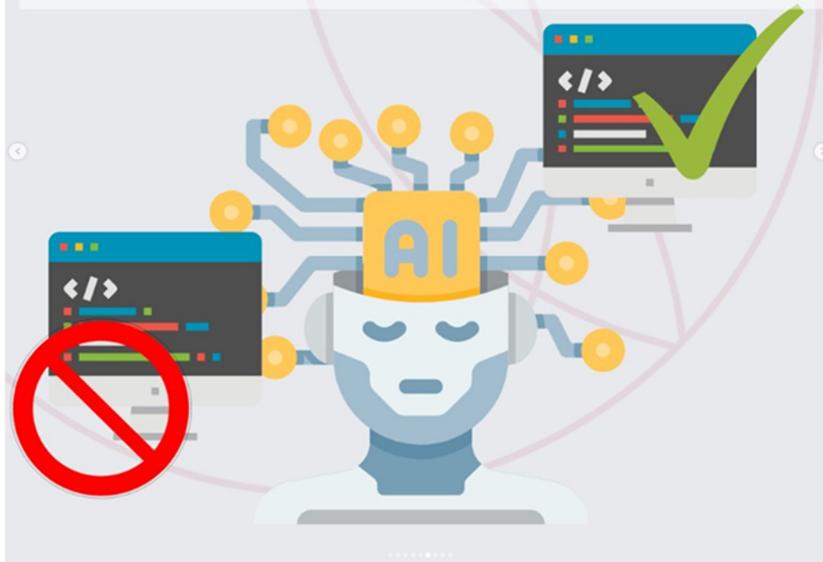
## HOW DOES ONTOTRANS DO THAT?

3) OntoTrans then connects the new innovation case via the ontology with existing relevant information sources, i.e., available data and materials modelling solutions



## HOW DOES ONTOTRANS DO THAT?

4) OntoTrans then recommends appropriate materials modelling workflow options



## THIS MEANS ONTOTRANS

is a Knowledge Management System for Research and Innovation, that ...

- ... reflects and maintains enterprise knowledge
- ... combines diverse content in connected data sources
- ... finds and utilises relevant information more quickly
- ... provides more transparency
- ... makes better informed decisions
- ... uncovers insights



# THE BENEFITS OF ONTOTRANS

Includes Models : "Live data" is represented during acquisition



provides recommendation and guidance through curated knowledge captured in an ontology

recommendations and knowledge graphs support exploration through reasoning, insights and decisions



## 3.2. The OntoTrans ESS

Published on 8<sup>th</sup> May 2023

Artworks by Clker-Free-Vector-Images from pixabay, Divyansh100 from pixabay, Mathilde Dare's Images, Mememie, Muhammad Atiq, OpenClipart-Vectors from pixabay, Procrea, Sketchify Education, and Vectorart86.



## WHAT HAPPENS WHEN YOU SEARCH ON THE INTERNET?

Traditional search systems heavily rely on the popular **query-response paradigm**. They are very successful for well-defined information needs with a precise goal in mind.



## 'WHAT IS THE LONGEST RIVER IN SOUTH AMERICA?'

**Very precise question:** you are looking for a specific body of water on a specific continent.

You **"google"** it - or use another search engine of your choice

**You find a clear answer:** The Amazon River, 6,400 km long - now you KNOW!!!!



## WITH AN ESS, YOU WANT TO LEARN MORE ...

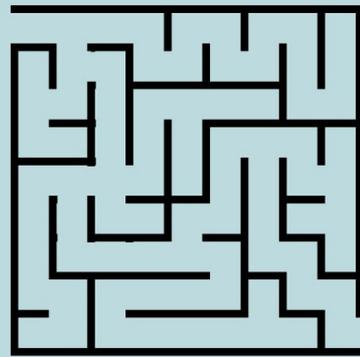
You are looking for an increased level of interaction between you and the search system

-> YOU CAN IMAGINE AN ESS LIKE A MAZE

-> you go from one intersection to the next

-> the next turn always relates to the last turn you took

-> new answers lead to new questions



## FOR EXAMPLE, I WANT TO LEARN MORE ABOUT STANLEY KUBRICK...



Oh, he did movies ...

He also wrote books- I did not know that ...



He does have quite the CV ...

You learned something new!



# WE DO NEED AN ESS FOR ONTOTRANS

We want to give our translators the opportunity to  
**explore knowledge**

translators can access all knowledge about processes  
and learn easier, reliably look for information  
customised for materials engineers, share knowledge  
easier and connect topics

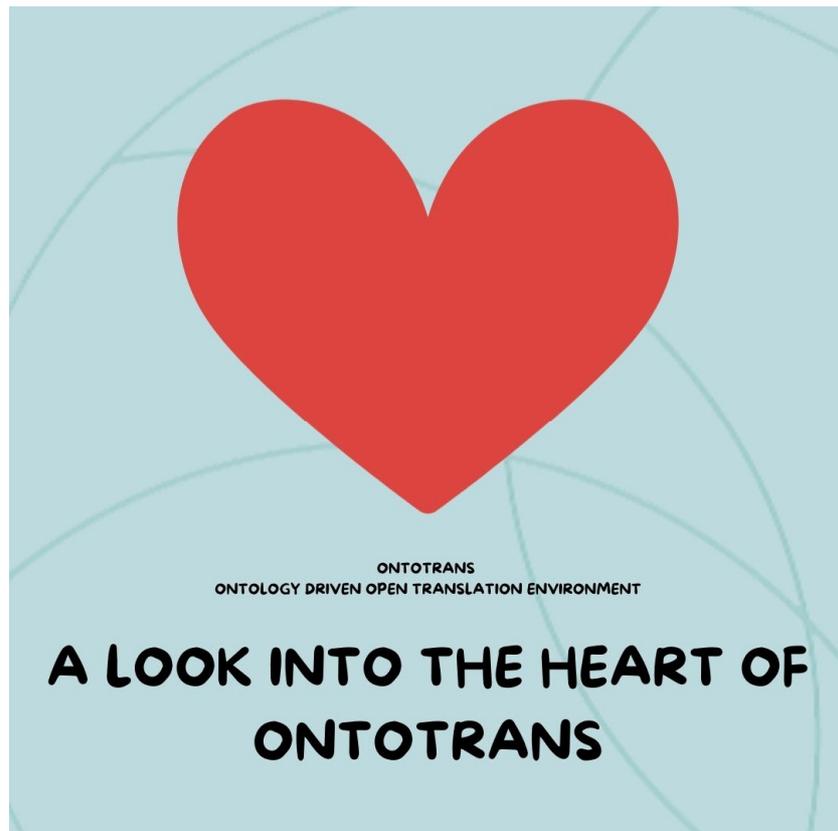
the goal of the ESS is to think outside the box,  
connect topics and to discover new knowledge



### 3.3. A Look into the Heart of OntoTrans

Published on 14<sup>th</sup> August 2023

Artworks by Canva Creative Studio, Clker-Free-Vector-Images from pixabay, Fusion Books, HtcHnm from pixabay, Popular Logos, sketchify, Sketchify Education, sparklestroke, and Trendify.



## MEET ONTOREC AND ONTOKB



The heart of OntoTrans is composed of two (logical) components, namely **OntoREC**, which will work as recommendation system, and **OntoKB**, which will handle the knowledge base

## ONTOREC - THE ONTOTRANS RECOMMENDATION SYSTEM

The OntoREC entity is meant to facilitate and to standardize (as well as to control) the access to the **knowledge base** by providing a set of Application Programming Interfaces (APIs). The OntoRec entity will provide the main way to interact with **OntoKB**.



## ONTOKB - THE KNOWLEDGE BASE

The OntoKB entity will leverage an **RDF Triplestore** database as well as a reasoning engine - containing the **semantic knowledge** necessary



## WHAT WILL THE HEART OF ONTOTRANS DO?

It connects innovation cases to knowledge sources

MarketPlace data and simulation services

Physics-based Modelling Software

Materials Databases

Data Driven Modelling Software

ML/AI

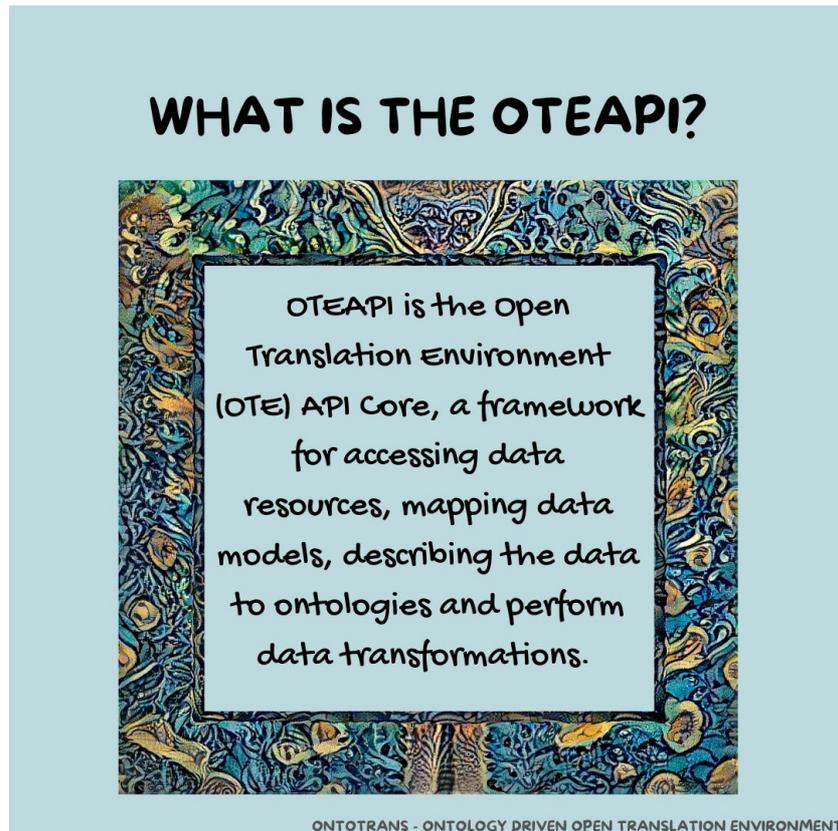
Business Databases



### 3.4. What is the OTEAPI?

Published on 21<sup>st</sup> May 2024

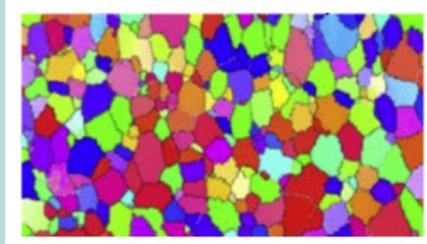
Artworks by carnicerofilms from pixabay and SINTEF.

An infographic with a light blue background. At the top, the title "WHAT IS THE OTEAPI?" is written in bold black capital letters. Below the title is a decorative border made of intricate, colorful patterns in shades of blue, green, and gold. Inside this border is a white rectangular box containing the following text: "OTEAPI is the Open Translation Environment (OTE) API Core, a framework for accessing data resources, mapping data models, describing the data to ontologies and perform data transformations." At the bottom of the infographic, the text "ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT" is written in small, black, all-caps font.

**WHAT IS THE OTEAPI?**

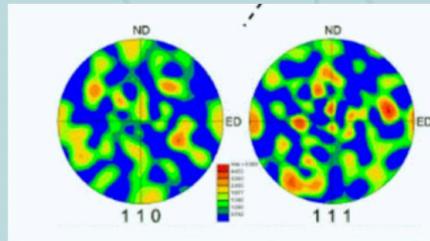
OTEAPI is the Open Translation Environment (OTE) API Core, a framework for accessing data resources, mapping data models, describing the data to ontologies and perform data transformations.

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT



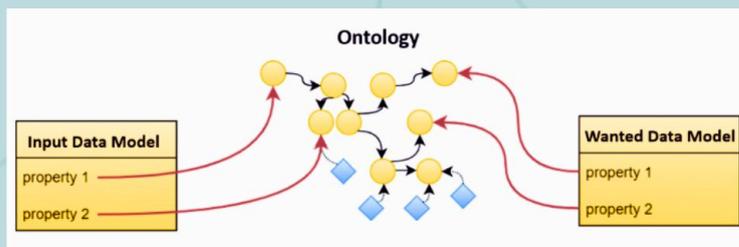
This is the experimental grain orientation of an aluminium alloy

This is what an end-user wants: the grain distribution as a polefigure, i.e., the graphical representation of the orientation of grains in space



ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

The OTEAPI will access the original data and parse them into an instance of the input data model



We harness our EMMO to take the input data model and associate it with ontological concepts

the OTEAPI can then generate the wanted data format

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## 4. Posts about Topics related to OntoTrans

### 4.1. What is Materials Modelling and Materials Innovation?

Published on 17<sup>th</sup> June 2022

Artworks by Drawcee, iconsy, sketchify, and sparklestroke.



# MATERIALS MODELLING

combines science and industry



replaces and reduces experiments

-> IT HELPS US TO SAVE VALUABLE TIME!

calculates properties which are complicated to measure and widens our understanding



-> IT CREATES VALUABLE KNOWLEDGE!

# MATERIALS MODELLING 101

2) 'bring' it into the computer



3) create a 'digital twin' and perform calculations



1) look at the 'real thing' eg. a car motor



4) interpret the outcome and match the results with the 'real thing'

## WE NEED INNOVATION IN MATERIALS SCIENCE

to create longer lasting materials

to replace rare materials

to increase recyclability

to tackle climate change



## THE ONTOTRANS PROJECT

develops a **TRANSLATION ENVIRONMENT**

-> actual software

-> translates materials challenges

into readily available modelling solutions



OntoTrans creates industrial innovation for its end users!!

## 4.2. Open Innovation Environments

Published on 22<sup>nd</sup> June 2022

Artworks by 09910190, ArtsyBeeKids, Fusion Books, sketchify, and sparklestroke.



## OPEN INNOVATION ENVIRONMENTS

useful for science and industry

in an OIE organisation internal ideas are combined with external ideas

Thus, the goal of an OIE is the creation of eco-system centric and cross-organisational innovation based on integrated collaboration and co-created shared value!

-> OPEN INNOVATION 2.0

Goldbeck et al. (2022)

## OPEN INNOVATION IN HISTORY

The Romans used Open Innovation by offering citizenship to skilled people in return for their labour and know-how.

In the salons of Vienna, Austria Open Innovation was formed in the 1900s. Since women often weren't able to attend universities they created their own space for knowledge exchange in the multicultural environment of Vienna.

In London, United Kingdom, the Expos starting in 1851 were Open Innovation Environments for technological innovation. There, the brightest people of various nations could discuss developments and new trends in their fields of expertise.

Goldbeck et al. (2022)

## OIE IN MATERIALS SCIENCES AS RELEVANT AS EVER

it can increase the impact of research investments and improve the transfer of science to innovation by



### CLUSTERING

of initiatives and projects in key areas like nanosafety, modelling, characterisation, pilots and upscaling!



By doing so access to experimental and simulation data is possible which is essential for developing new materials faster!

Goldbeck et al. (2022)

## OPEN INNOVATION AND ONTOTRANS

OntoTrans enables **open innovation** by establishing a shared semantic basis, open and standardised data documentation and by offering co-innovation abilities and translation.

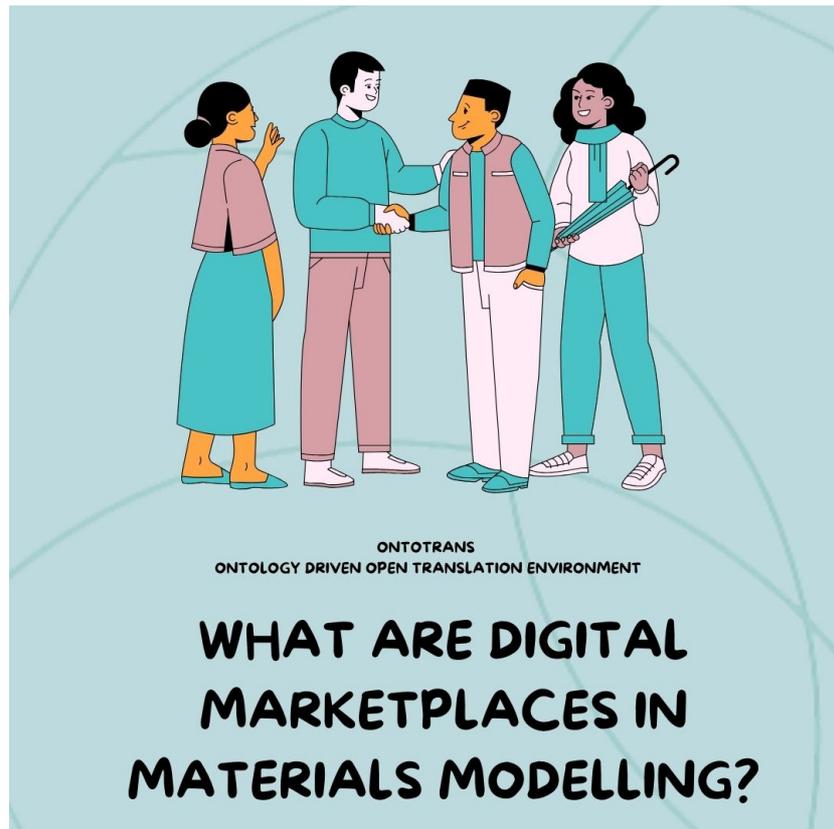


OntoTrans expects to create more **collaboration** and **co-innovation**, supporting industry to work with their value chain partners, and for citizens to become more closely involved in setting directions for products, by feeding in consumer preferences more directly into the research data/requirements.

### 4.3. Digital Marketplaces

Published on 8<sup>th</sup> August 2022

Artworks by iconsy, ShariJo from pixabay, sketchify, Sketchify Mexico, and Trendify.



# DIGITAL MARKETPLACES

are online platforms where transactions between buyers and sellers of products can be supported and streamlined

## THEY HELP US TO

- > create collaboration between two parties
- > build an overarching business environment to harmonise business models of different providers
- > enable the creation of new services and products
- > match buyers with suitable sellers and vice versa



Goldbeck, Gerhard, Simperter, Alexandra, & Moggi, Gabriele. (2022).

# DIGITAL MARKETPLACES IN R&D AND INDUSTRY

## RESEARCH AND DEVELOPMENT (R&D)



The first developed marketplaces were platforms for experts and information (eg patents). The wide use of outsourcing in the Pharmaceutical and Life Sciences sector was also another driving factor for growth.

## INDUSTRY AND MANUFACTURING



Marketplaces have formed around choosing materials based on their properties. In additive manufacturing and engineering providers often use simulation to service customers requiring specific parts more efficiently.

Goldbeck, Gerhard, Simperter, Alexandra, & Moggi, Gabriele. (2022).

## THE BENEFITS OF DIGITAL MARKETPLACES

digital marketplaces can create more **innovation** in materials modelling by offering the work of experts, software, hardware, data and especially knowledge in one place

marketplaces for materials modelling are currently still developing and therefore often referred to as 'forums'.



Digital marketplaces build **communities** in MM through fostering interactions between stakeholders, easing the access to use and bringing various actors together.

Goldbeck, Gerhard, Simperler, Alexandra, & Moggi, Gabriele. (2022).

## DIGITAL MARKETPLACES AND ONTOTRANS

The European material modelling marketplace projects environments (**VIMMP**, **marketplace**) are to connect Ontotrans with an environment aimed to host most of the relevant stakeholders in the field of materials modelling and to enable the **access to OntoTrans** through their interfaces



For further information you can visit our related projects' homepages:  
<https://vimmp.eu/>  
<https://the-marketplace.eu/>

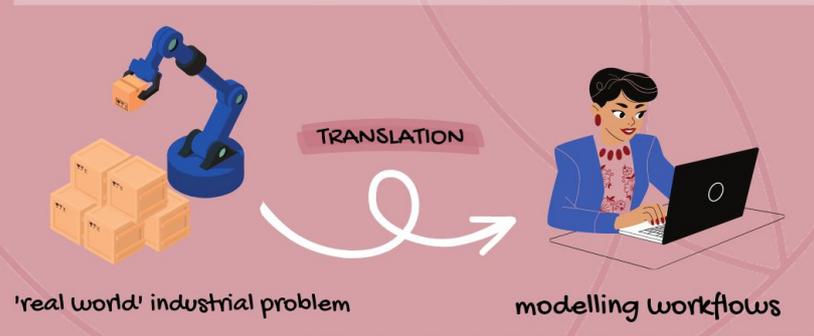
## 4.4. What is Translation?

Published on 28<sup>th</sup> October 2022

Artworks by ivandesign and sketchify.

# WHAT IS TRANSLATION?

In the context of EMMC, translation is the process of translating industrial problems into questions to be solved using modelling and simulations tools for, e.g., creating industrial innovation. Translators pick up industrial challenges, transform them to modelling workflows, and guide manufacturers in execution and interpretation of modelling results.

The diagram illustrates the translation process. On the left, a blue robotic arm is shown next to a stack of four orange boxes, representing a 'real world' industrial problem. A white arrow with a circular path above it points to the right, where a woman in a blue blazer is sitting at a desk with a laptop, representing 'modelling workflows'. The word 'TRANSLATION' is written in a pink box above the arrow. At the bottom of the diagram, the text 'ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT' is displayed.

'real world' industrial problem

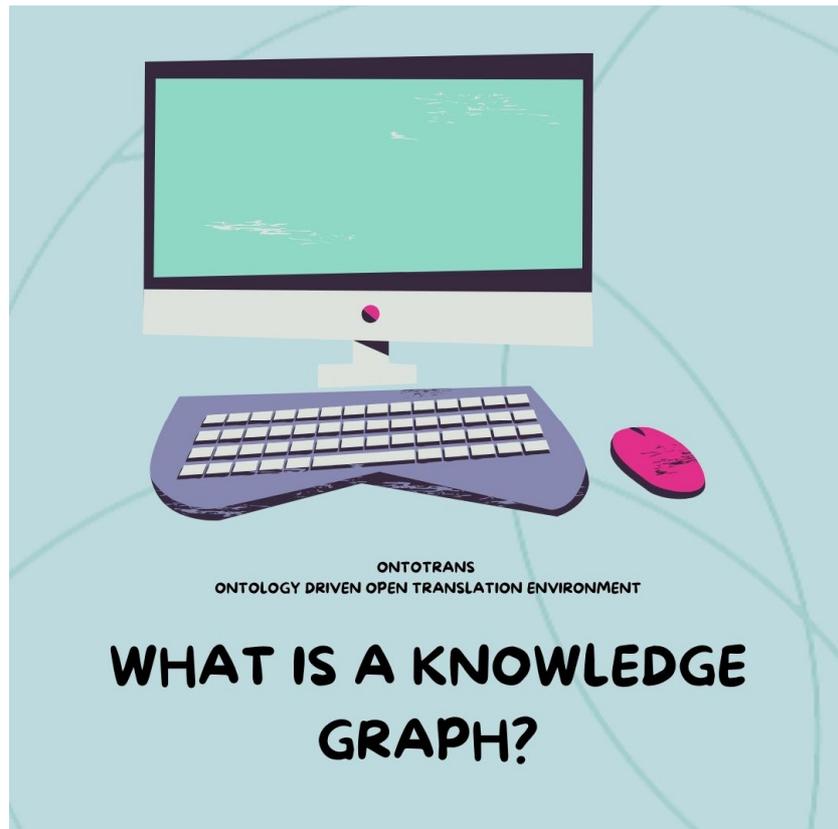
modelling workflows

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## 4.5. What is a Knowledge Graph?

Published on 6<sup>th</sup> December 2022

Artworks by Greenflash, iconsy, OpenClipart-Vectors from pixabay, sketchify, and Twemoji.

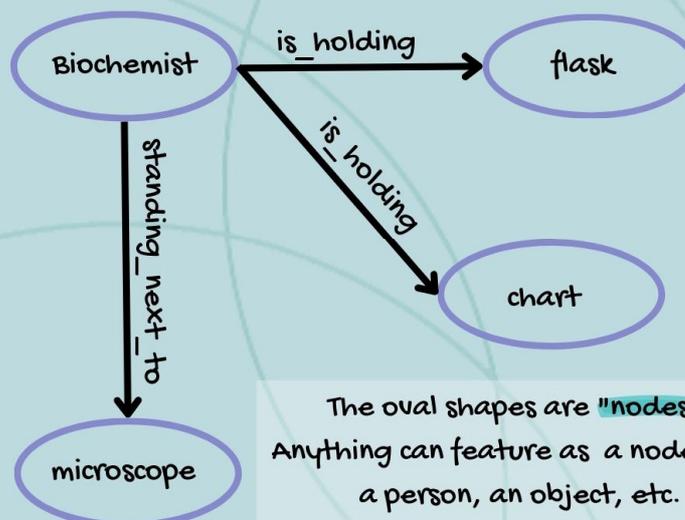


## LET'S OBSERVE A SITUATION!

The Biochemist is holding a flask and a chart and is standing next to a microscope



## LET'S BUILD A SIMPLE KNOWLEDGE GRAPH FROM THAT SITUATION!



The oval shapes are "nodes".  
Anything can feature as a node, e.g.  
a person, an object, etc.

The arrows are "edges" and their labels capture the relationship of interest between the nodes

## WHAT ARE KNOWLEDGE GRAPHS FOR?

- to structure knowledge
- to integrate information extracted from multiple data sources
- to represent the information extracted using natural language processing
- to use as input into machine learning/databased models



## HOW DO WE MAKE KNOWLEDGE GRAPHS MACHINE READABLE?

-> code needs to be written!

For example, using the extensible Markup Language (XML - surface syntax for the whole internet, was designed to carry data)

PLUS

Resource Description Framework (RDF)  
(semantics framework for metadata conveniently,  
RDF is a graph data model)



## HOW IS THIS RELATED TO ONTOLOGIES AS WE USE THEM IN ONTOTRANS?

An Ontology gives us a schema, e.g.



-> a persons can do something with objects - **GENERAL**

A Knowledge Graph captures the data, e.g.

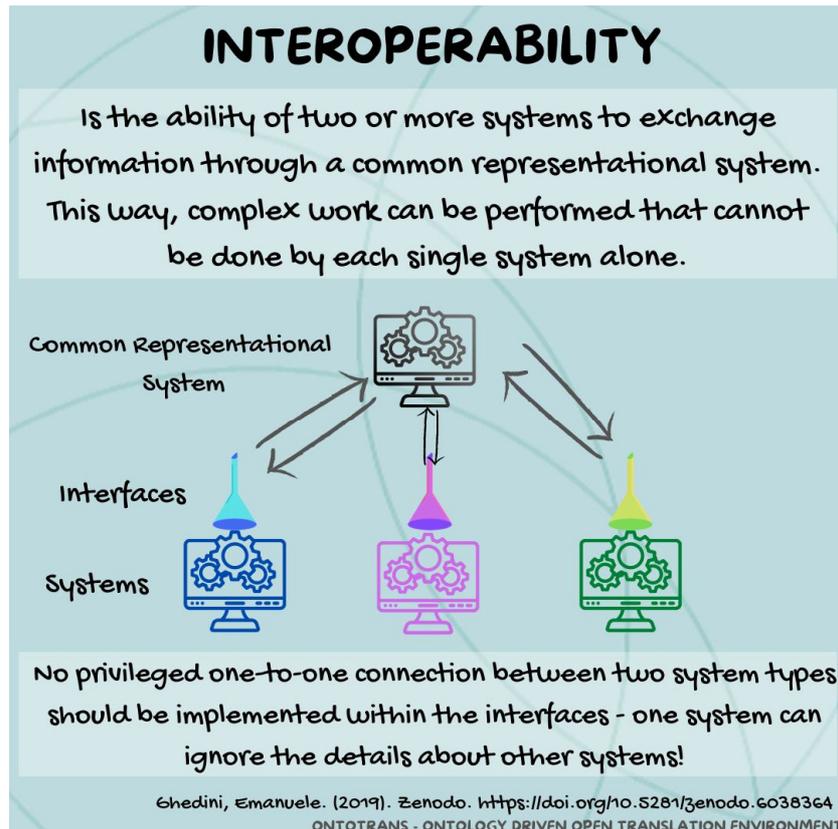


-> who is doing what to what kind of object? - **SPECIFIC**

## 4.6. Interoperability

Published on 27<sup>th</sup> February 2023

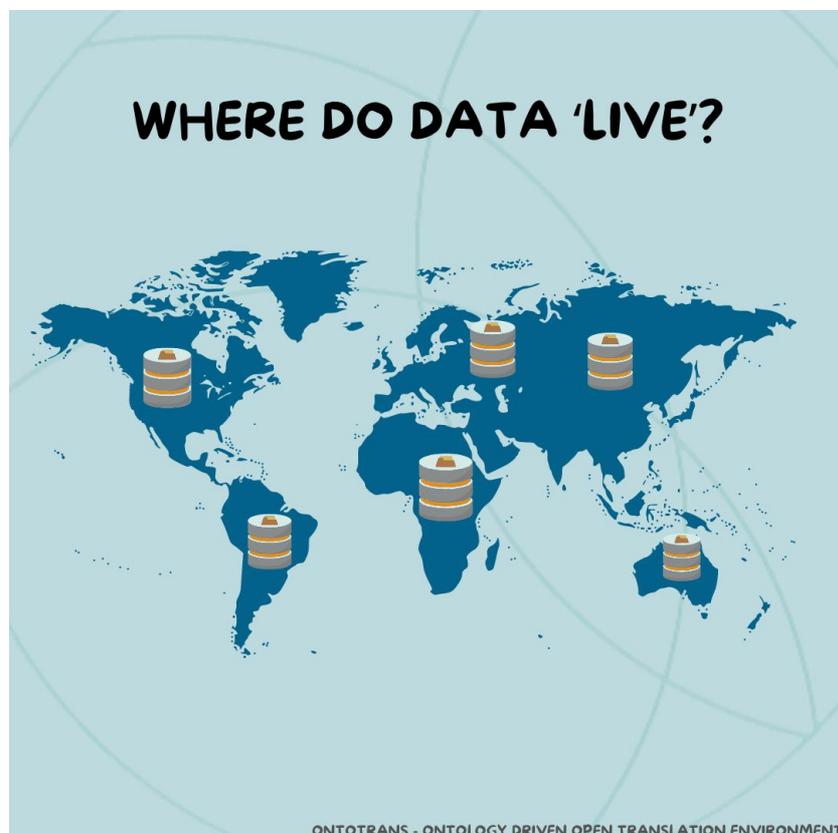
Artworks by SatawatFoto and sketchify.



## 4.7. Where do Data 'live'?

Published on 11<sup>th</sup> December 2023

Artworks by Alphavector, amethyststudio, Clker-Free-Vector-Images from pixabay, inspire-studio from pixabay, LiteraSign, OpenClipart-Vectors from pixabay, Plaid4You, Rizki Ahmad Fauzi, sketchify, Sketchify Education, sparklestroke, TheDigitalArtist from pixabay, Trendify, Triyo Design, and Unfold X.



## DATA SILOS



Verdict: Not the ideal habitat  
All data are kept isolated - not easily or fully accessible, they cannot interact, and worst of all, they may be forgotten...



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## DATA LAKES



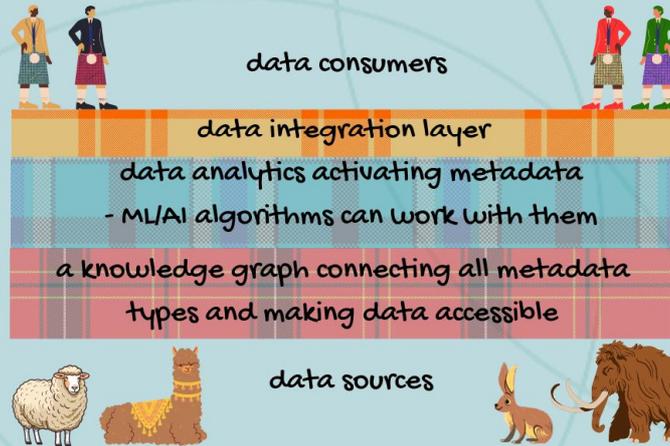
... data can be stored in its natural/raw format. We can access them in one single place. BUT if not carefully managed ... you end up with a data swamp!



ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

# DATA FABRICS

...continuous analytics over existing, discoverable and inference metadata assets, continuously identify and connect data from disparate applications



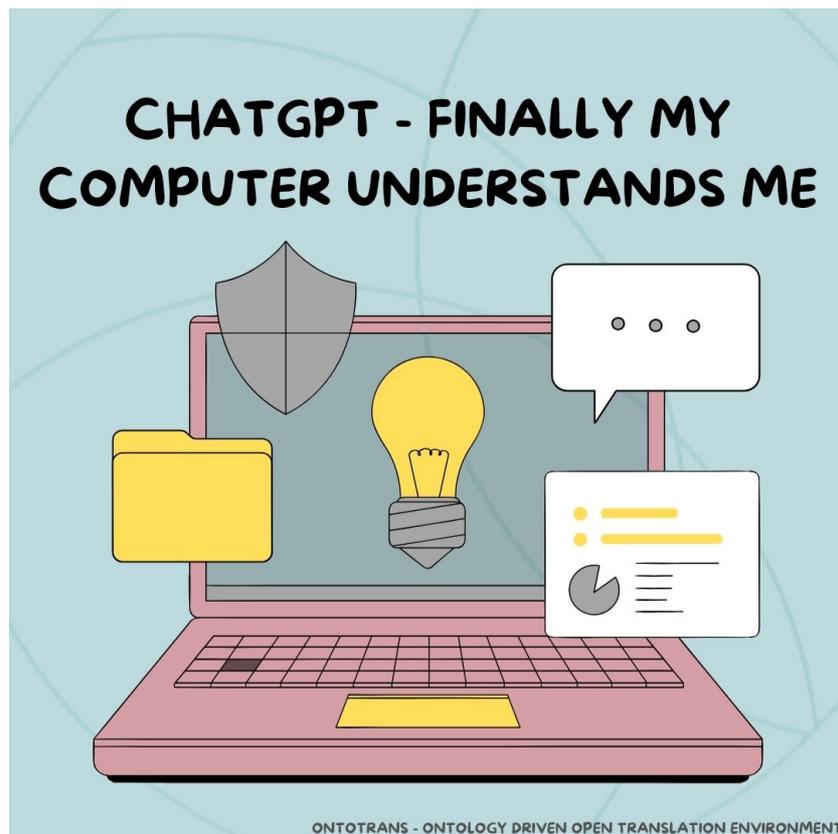
<https://www.gartner.com/smarterwithgartner/data-fabric-architecture-is-key-to-modernizing-data-management-and-integration>

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## 4.8. ChatGPT - finally my Computer understands me

Published on 12<sup>th</sup> January 2024

Artworks by Aliaksandr Huseu, amethyststudio, Joanna Rzońca, Juno, Shutterstock, sketchify, Sketchify Education, Sketchify Philippines, and Sparklestroke.



## CHATGPT INTEGRATES AN LLM

LLM stands for **Large Language Model**;  
They seem to “understand” natural language  
and “respond” ... but how does this work?

What colour is  
this dress?



For this question,  
we expect certain  
answers  
comprising **colour**



Endless possibilities...

“Red”

“It’s red”

“It is red”

“The dress is red”

“The dress is bright red”

“It is red with white  
dots”

... and many more

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## WHAT DO WE KNOW ABOUT LANGUAGES?

- There are words in current use (170,000 in English)
- We stitch words together (syntax)
- Words have a meaning (semantics)
- Questions trigger answers (right or wrong)

What colours  
do apples  
have?



“Blue with white dots” is  
grammatically correct but  
not the right answer

ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## HOW DOES CHATGPT GIVE NEW ANSWERS?

GPT stands for **Generative pre-trained transformers**.  
 GPTs are multi-layered neuronal networks (NNs) that realise an LLM.

The LLM will take your input request, analyze its tokens and start stitching up an answer, word by word, or phrase by phrase, each word or phrase selected using the patterns it learned before and taking into account your input.



ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## HOW DO WE CREATE AN LLM FOR ENGLISH?

1. We write a programme that lets an LLM build itself!
2. We give it mountains of digitised text and
3. Let the LLM detect patterns and rules in it, Repeatedly giving feedback until satisfied with LLM's output quality



ONTOTRANS - ONTOLOGY DRIVEN OPEN TRANSLATION ENVIRONMENT

## 4.9. Fantastic FAIR

Published on 29<sup>th</sup> January 2024

Artworks from Królestwo\_Nauki from pixabay, sketchify, sparklestroke, studio, and Twemoji.

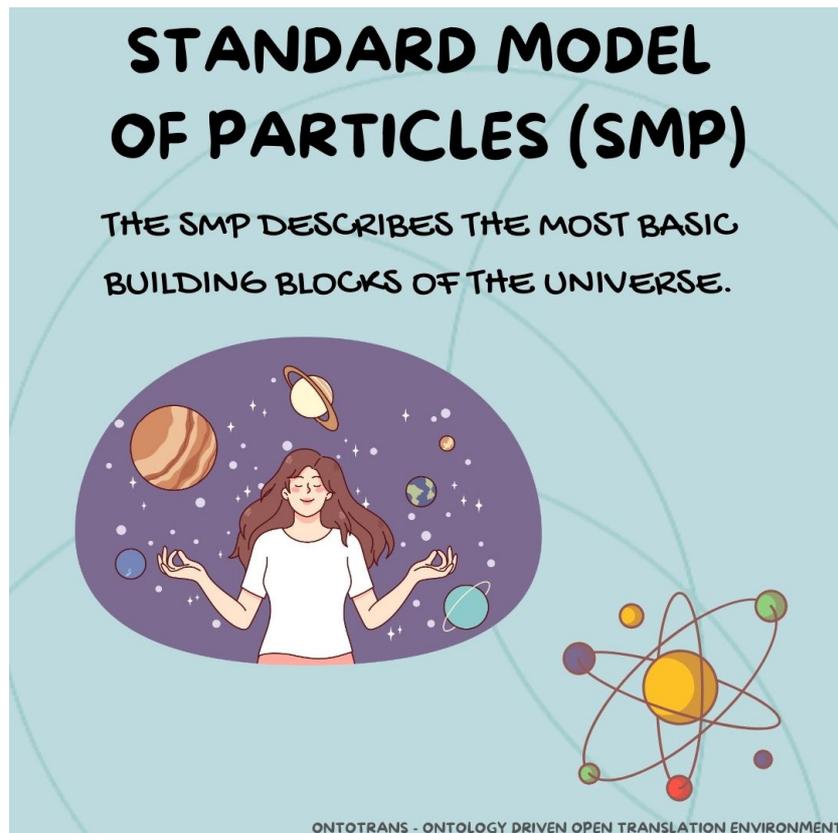




## 4.10. Standard Model of Particles (SMP)

Published on 4<sup>th</sup> March 2024

Artworks by Drawlab19, imagineHarry from Trendify, sparklestroke



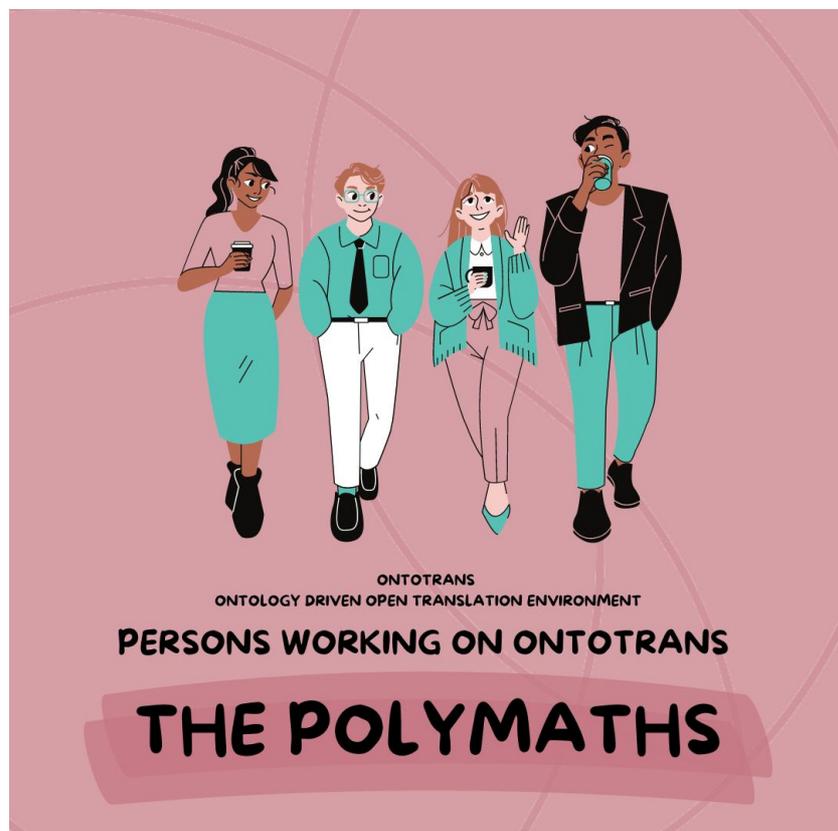


## 5. Posts about Persons Working on OntoTrans

### 5.1. The Polymaths

Published on 27<sup>th</sup> June 2022

Artworks by olahgaris, OpenClipart-Vectors from pixabay, sketchify, sparklestroke, and videoplasty.



"a person who knows a lot about many different subjects"



<https://dictionary.cambridge.org/dictionary/english/polymath>

## ... SOMETIMES MISUNDERSTOOD

... you know too much!

... concentrate on one subject!

... how many domains can one person cross?

... where are you going with this?



**... BUT THEY ARE CURIOUS  
AND READY FOR ADVENTURES**



semantics, ontologies and the wardrobe  
-> if there are open doors they just  
cannot resist

**WORKING WITH  
ONTOTRANS REQUIRES  
POLYMATHS**

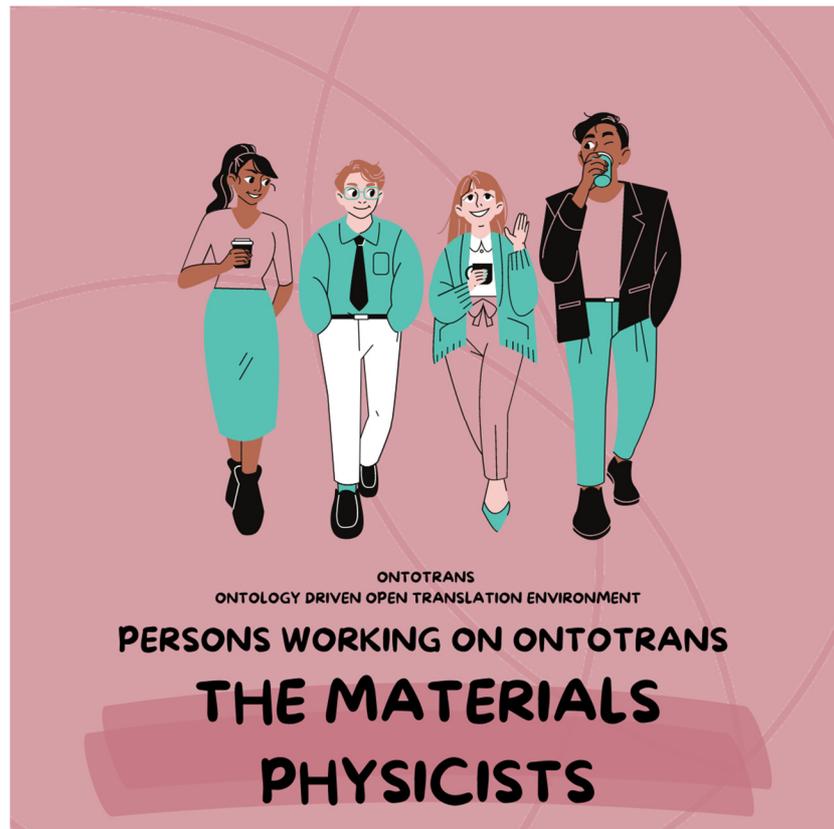


We want many people with many boxes  
to think outside of them

## 5.2. The Materials Physicists

Published on 18<sup>th</sup> July 2022

Artworks by Canva Creative Studio, OpenClipart-Vectors from pixabay, pongsakornjun, sketchify, Sketchify Korea, sparklestroke, Sparklestroke Global, and Statement Goods.



## A MATERIALS PHYSICIST

is someone who works in the field of  
materials science

**MATERIALS SCIENCE:** The study of the characteristics and uses of the various materials, such as metals, ceramics and plastics, that are employed in science and technology



<https://www.thefreedictionary.com/materials-science>

## THEY UNDERSTAND THEIR SOLIDS INSIDE OUT

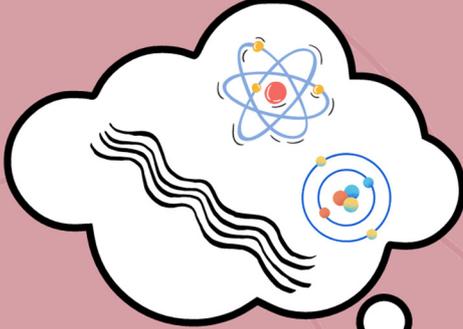
... electronic  
properties

... optical  
properties



... alloys

... thermodynamics

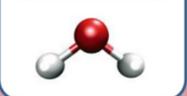
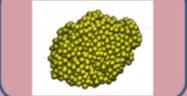
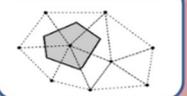
A thought bubble containing two different atomic models: one with a central nucleus and orbiting electrons, and another with a central nucleus and orbiting protons and neutrons.

**THEY LOVE THEIR PLANE WAVES AND ELECTRONIC MODELS**

-> but they also want to know what their materials do in the **real world**

An illustration of a woman in an orange dress, standing with her hand on her chin in a thinking pose.

**GOING ACROSS SCALES**

ELECTRONS	ATOMS	BEADS	CONTINUUM VOLUME
			

-> they want to move from one model to another with **semantic interoperability**

An illustration of a suspension bridge with two towers and cables, symbolizing a bridge between different scales or models.

## WORKING WITH ONTOTRANS REQUIRES MATERIALS PHYSICISTS



-> We want many people  
working with multiscale  
workflows and a fully  
interoperable  
Integrated Multiscale  
Simulation Environment



### 5.3. The Materials Modelling Consultants

Published on 5<sup>th</sup> September 2022

Artworks by Canva Creative Studio, iconsy, OpenClipart-Vectors from pixabay, ShariJo by pixabay, sketchify, Sketchify Philippines, sparklestroke, Sparklestroke Global, viktoriiablohina, and videoplasty.



An illustration of a man and a woman sitting on yellow armchairs, engaged in a conversation. A potted plant is on the left. A large speech bubble contains the definition of a consultant. A white arrow points from the speech bubble towards the right. A vertical URL is on the right side.

**CONSULTANT**  
= a person who gives professional or expert advice

<https://www.thefreedictionary.com/consultants>

An illustration of a woman in a blue suit and orange hard hat standing with her arms crossed. A thought bubble above her head contains various icons related to materials and modelling, including a lightbulb, a graduation cap, a battery, and the ONTOTRANS logo. Below the thought bubble, text describes the specialization of their consultants.

**OUR CONSULTANTS ARE SPECIALISED IN MATERIALS AND MATERIALS MODELLING**

## THEIR CUSTOMERS WANT TO GET OUT MORE OF THEIR DATA



## WHEN THERE IS A REAL CHAOS OF...



## ... CONSULTANTS FACILITATE THE USE OF MODA AND THE EMMO

### MODA

"Materials modelling - terminology, classification and metadata", several stakeholders formally agreed on the terminology used to describe materials modelling

-> <https://emmc.eu/moda/>



### EMMO

Elementary Multiperspective Material Ontology, a semantic framework for the applied science

-> <https://github.com/emmo-repo/EMMO>

## WORKING WITH ONTOTRANS REQUIRES CONSULTANTS



They hover like eagles over our project, find new trends and keep a watchful eye that our team follows established standards.

They also facilitate and support our project members in bringing in new ideas and getting creative.



## 5.4. The Communication Team

Published on 3<sup>rd</sup> October 2022

Artworks by Clker-Free-Vector-Images from pixabay, logosandbrands, M.Wallflower by Trendify, Nevinity, OpenClipart-Vectors from pixabay, Popular Logos, sketchify, and Sketchify Education.



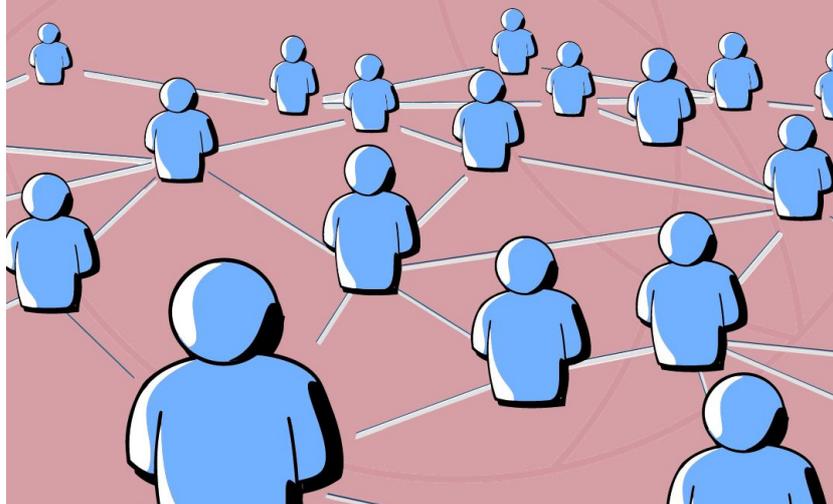
## OUR COMMUNICATION TEAM MEMBERS ARE DIVERSE!

They all have different skill sets and bring them in. We have humanists, educators, musicians, etc. on board who love to create content and in true EU spirit broadcast to the citizens of the world!



## THEY LEARNED A LOT ABOUT ONTOLOGIES

and want to share their gained knowledge with the world and connect!



## THEY USE SOCIAL MEDIA



...to tell you all about ontologies, materials modelling and materials physics, project updates, events and more!



## OUR COMMUNICATION TEAM

- > creates content for a broad range of persons
- > distributes findings and share our colleagues' original research work with you
- > wants you to get the Ontology bug, too!



# WE ARE CREATING AN ENVIRONMENT AROUND ONTOTRANS

You can learn with us, try stuff, and use Ontotrans for your work at some point!



We want all of you to turn into OntoCommunicators!

## 5.5. The Convergent Thinkers

Published on 28<sup>th</sup> November 2022

Artworks by iconsy, sketchify, sparklestroke, studio, Twemoji, and viktoriiablohina.

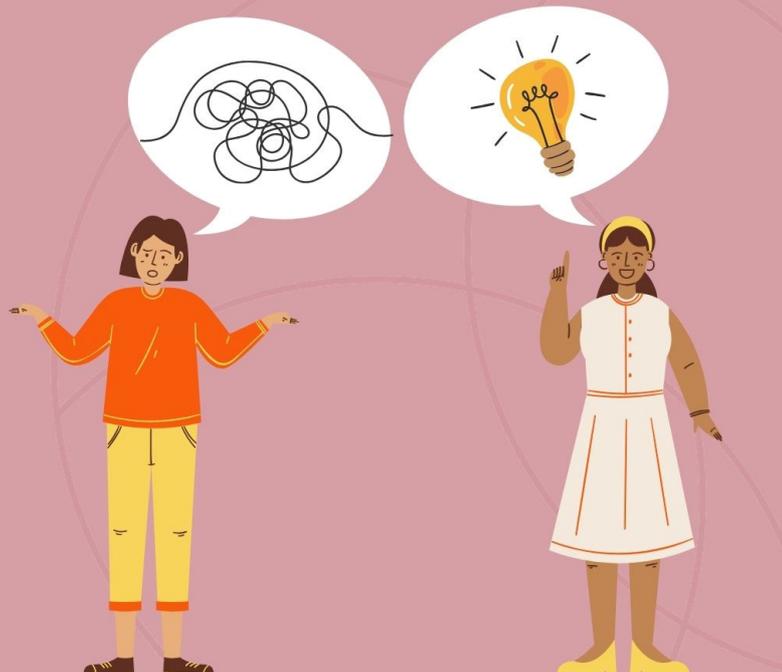


"Convergent thinking occurs when the solution to a problem can be deduced by applying established rules and logical reasoning. This type of reasoning involves solving a problem within the context of known information and narrowing down the solution based on logical inference."

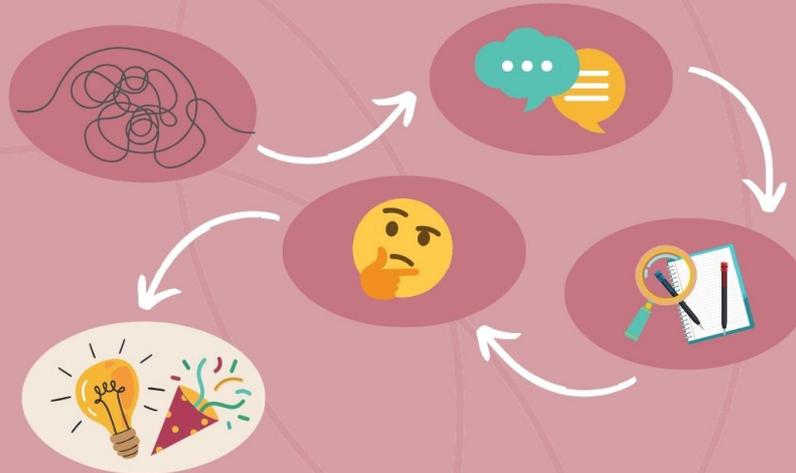


<https://www.sciencedirect.com/topics/psychology/convergent-thinking>

**THEIR CLIENTS SEEK THEM,  
BECAUSE SOMETHING IS NOT RIGHT**



## CONVERGENT THINKERS KNOW DISTINCT MANUFACTURING WORKFLOWS INSIDE OUT



in confidential settings they will interview persons on client's side and try to deduct why particular processes went wrong

## THEY NEED TO BE THOROUGH AND CREATIVE IN THEIR WORK



After some deduction work to find out which rule is best to be applied as guiding principle they may find out it was a new charge of chemicals never used before that caused the change!

**... AND ALL ENDS WELL!**

## WORKING WITH ONTOTRANS ENABLES ...

...clients to ontologise their workflow-related knowledge and capture their processes with the aid of a convergent thinker

...Convergent thinkers to help with occurring problems in the future



We want many convergent thinkers to use OntoTrans for creative problem solving with their clients!

## 5.6. The PhD Students

Published on 20<sup>th</sup> February 2023

Artworks by amethyststudio, Clker-Free-Vector-Images from pixabay, HtcHnm from pixabay, Image Free Download, pongsakornjun, ShariJo from pixabay, sketchify, Sketchify Japan, sparklestroke, Trendify, and Twemoji.



## PHD STUDENTS

are working towards a Doctor Title and undertake research work affiliated with a university



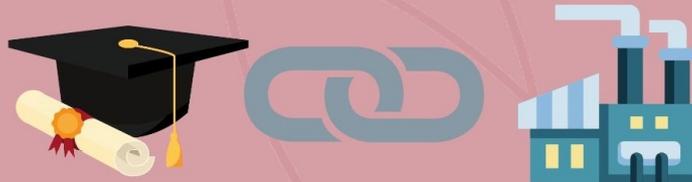
## WHAT ATTRACTS THEM TO ONTOTRANS IS

the connection between both philosophy and applied science. With ontoTrans you can be an engineer and a philosopher. Our PhD students can open a dialogue between the two disciplines and start the flow from theory formalisation to practice needs and vice versa.



## WE ALSO OFFER

...a direct link between the research world  
and the industrial world



...a group of multidisciplinary researchers and  
experts



## OUR PHD STUDENTS ARE LIKE STEM CELLS



...they can be anything!

They still remember their school education,  
they have their individual passions, interests  
and have the willingness to try new things.

## WHILE WORKING ON ONTOTRANS THEY CAN

- > apply and further explore their talents!
- > infect all partners and stakeholders with their fascination about new research
- > help all researchers see ontoTrans through a person's eyes who is in their early career stages
- > gain insights into European research and innovation projects and transnational academic and industrial collaboration

## 5.7. The Computer Scientists

22<sup>nd</sup> March 2023

Artworks by amethyststudio, Clker-Free-Vector-Images from pixabay, Drawcee, sketchify, Sketchify Education, Sketchify Japan, and sparklestroke.



## THE ONTOTRANS COMPUTER SCIENTISTS

apply theoretical expertise to  
real-world problems and write  
code



## THEY STARTED EARLY

By the time they  
are with us they  
did decades of  
developing  
software ...



## THEY ARE LOOKING FORWARD...

... to put maths and physics into software and develop tools for industry and people



## THEY ARE FACING THE CHALLENGES OF DATA AND DATA TRANSFER CONFIDENTLY...



... but suddenly those challenges can consume up to 80% of all the efforts when connecting two systems!

## OUR ONTOTRANS COMPUTER SCIENTIST FIXED THESE DATA TRANSFER ISSUES ...



...and created a clever system that delivers data just as their code/developed simulation tool needs it. No more fu33!

## WORKING WITH ONTOTRANS REQUIRES COMPUTER SCIENTISTS

... our simulation tools can now just "ask" for data how they need them  
... our teams write one reader and parser at a time which can be reused  
-> we work data model driven using meta data and ontological concepts

