



CelloGraph – Accelerating Knowledge Discovery for Cellulosic Materials using **AI** and **Knowledge Graphs**



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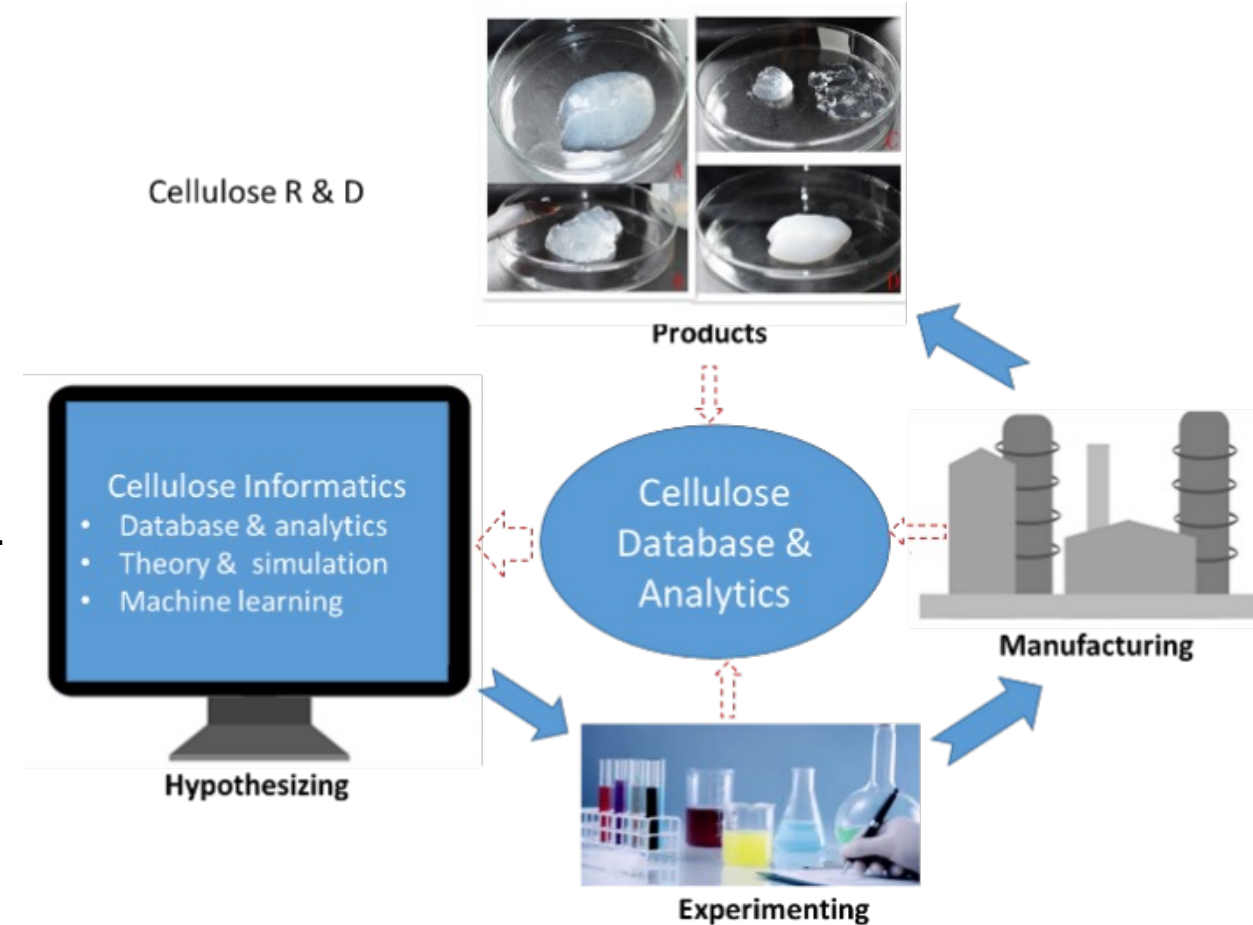
MOTIVATION AND OBJECTIVE

Motivation: Cellulose is

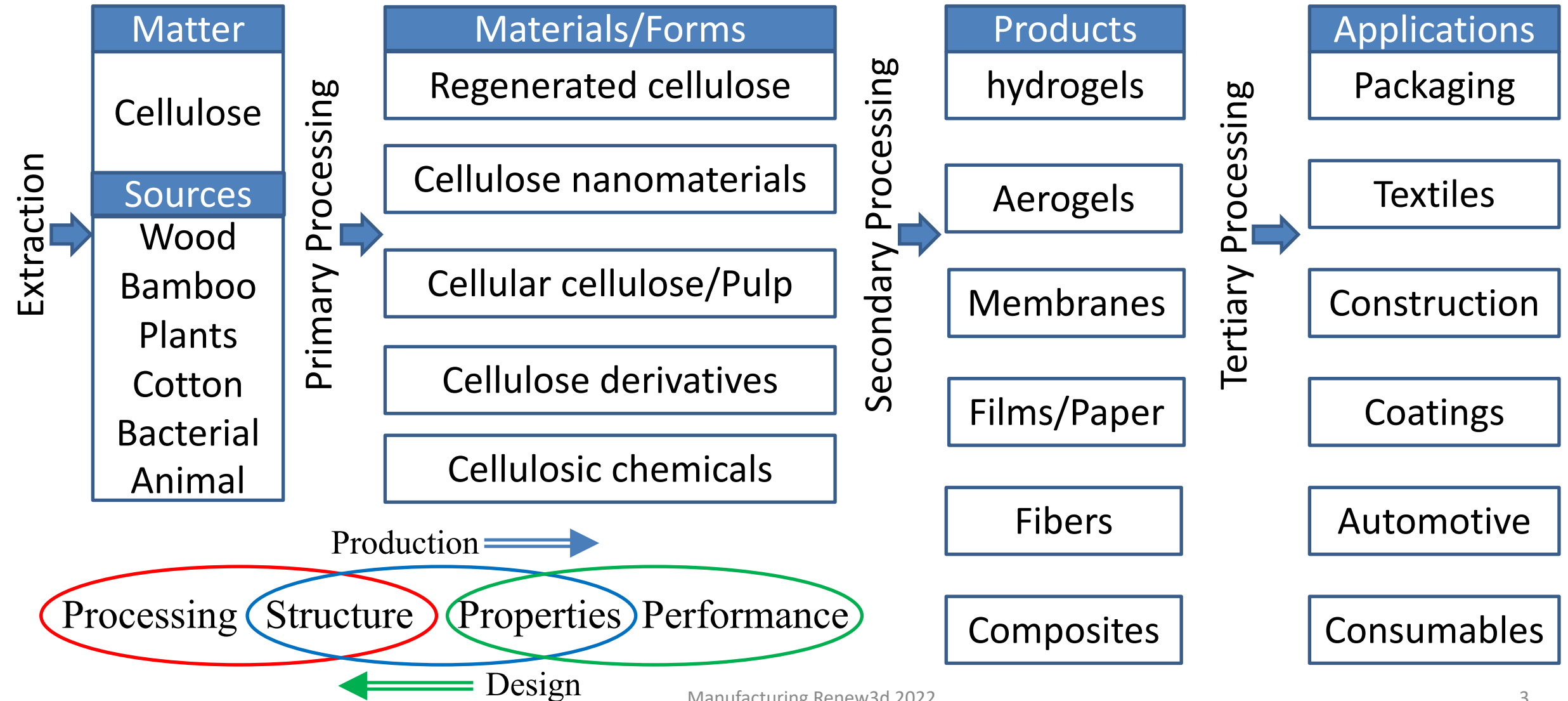
- abundant
- sustainable
- renewable
- versatile

Objective:

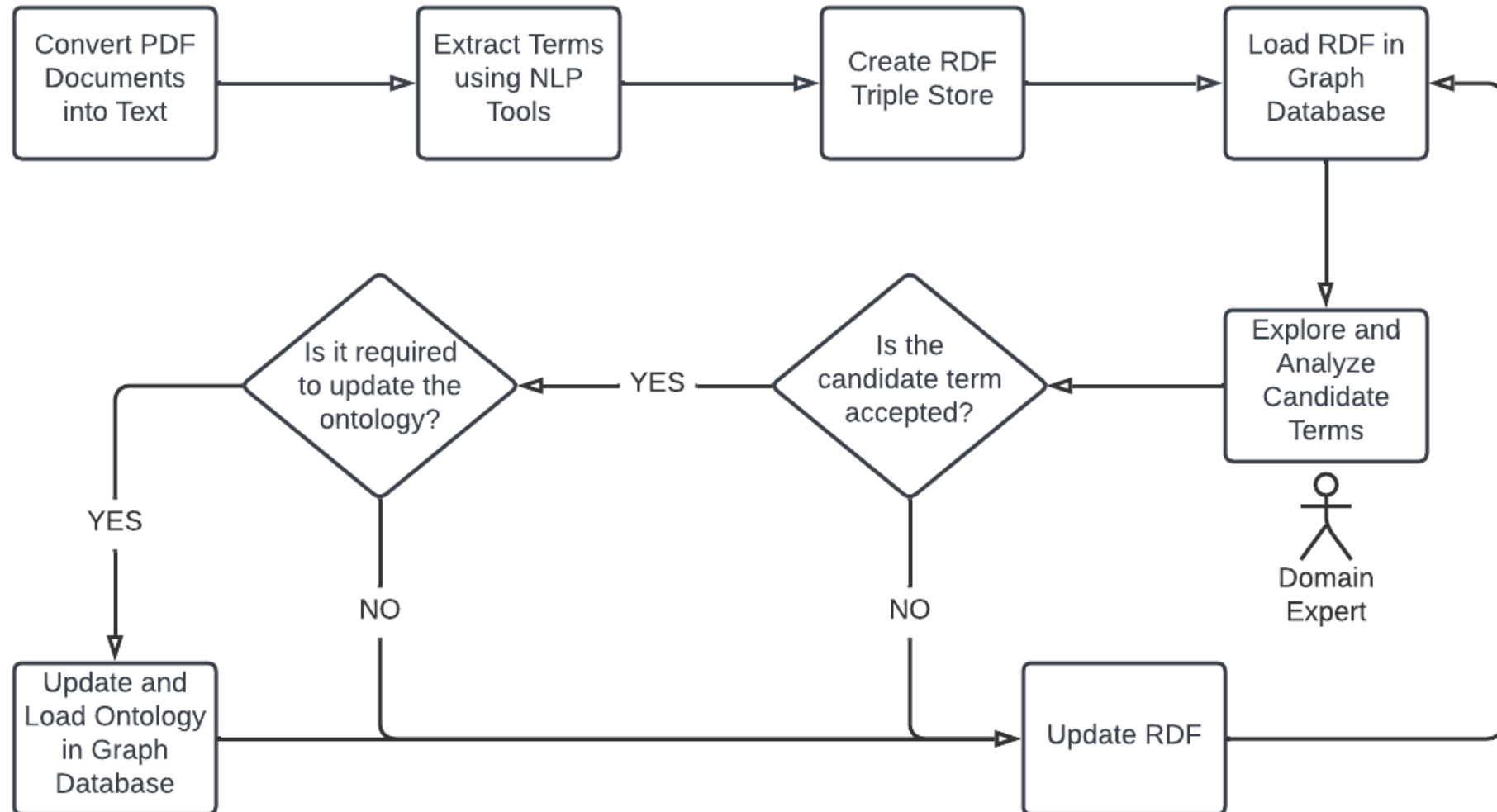
- Make knowledge about cellulose processing methods and applications more easily accessible.
- Accelerate the identify of new and innovative uses of cellulosic materials for various applications.
- Help quickly familiarize researchers and practitioners with state-of-the-art research.
- Avoid duplicative research.



ORGANIZING CELLULOSIC KNOWLEDGE IN AN ONTOLOGY



DATA PROCESSING PIPELINE



USE CASE

RDF Triple Store

```
:pubA rdf:type sp:ScientificPublication.

:Figure2 rdf:type sp:Figure ;
  sp:text 'Schematic of cellobiose.'^^xsd:string ;
  sp:figureNumber '2'^^xsd:nonNegativeInteger ;
  sp:page '2'^^xsd:nonNegativeInteger .

:Keyword3 rdf:type sp:Keywords ;
  sp:position '2'^^xsd:nonNegativeInteger ;
  sp:text 'Nanocellulose fiber'^^xsd:string .

:Term2 rdf:type sp:SingleTerm ;
  sp:text 'nanocellulose'^^xsd:string;
  :hasStatus :ConfirmedStatus1 ;
  sp:occursInText :AbsSent1 ,
    :Para1Sent3 ,
    :Para2Sent1 ,
    :Para2Sent2 .
```

Query: Pull all fragments which include 'cellulose'.

Executes on

Output

```
SELECT ?t ?p
WHERE {
  sp:pubA sp:containsText ?t .
  ?t sp:containsFragment ?f .
  ?f sp:text ?p .
  FILTER(CONTAINS(?p, "cellulose")).
}
```

	t	p
1	http://cellograph.com/SciPub/2022v1.0/pubASec1	"Nanocellulose is a natural nanomaterial which can be extracted from plant cell wall. "
2	http://cellograph.com/SciPub/2022v1.0/pubASec1	"With its nanometer size in diameter, nanocellulose consists of attractive properties such as high strength, excellent stiffness, and high surface area [1,2] "
3	http://cellograph.com/SciPub/2022v1.0/pubASec1	"Nowadays, nanocellulose gets high attraction from research and industries. "
4	http://cellograph.com/SciPub/2022v1.0/pubASec1	"The study of nanocellulose is not only about its extraction from biomass, but also the new applications in various fields. "
5	http://cellograph.com/SciPub/2022v1.0/pubASec1	"The aim of this review is to make a brief summary on the study of nanocellulose, including the typical extraction methods and the general and special applications. "

CONCLUSION AND OUTLOOK

Building an information system that allows ingesting and exploring the knowledge buried in scientific publication about cellulosic materials and products.

Specific products in development:

- Cellulose Ontology
- Scientific Publication Ontology

Next steps:

- Growing the Ontology and Database: Human-in-the-loop Curation
- Data Exploration Tools

