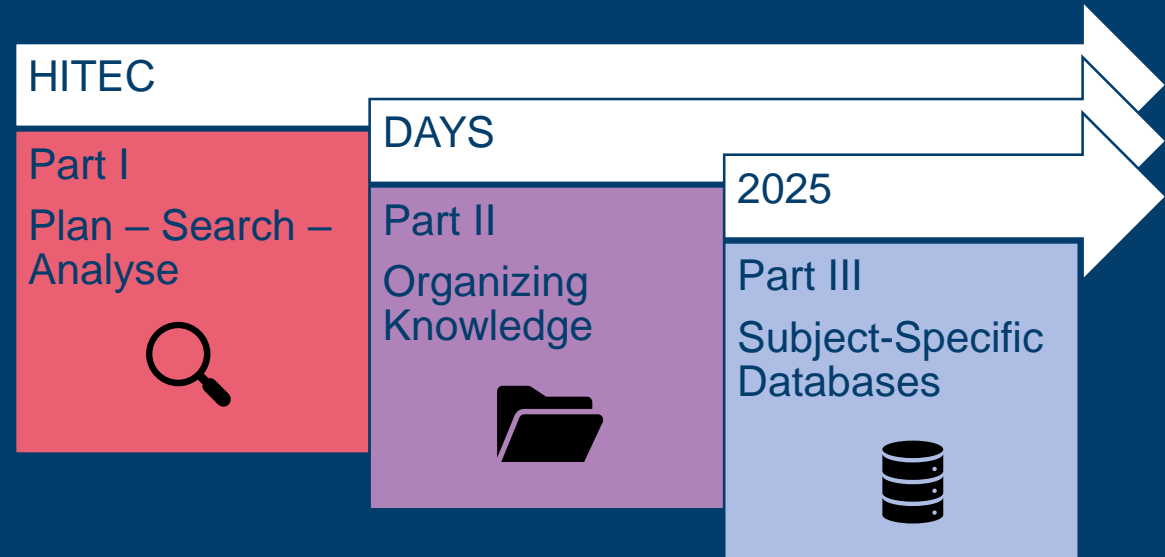


HOW TO ORGANIZE YOUR LITERATURE PROJECT

CARRY OUT A SYSTEMATIC LITERATURE SEARCH AND ORGANIZE REFERENCES

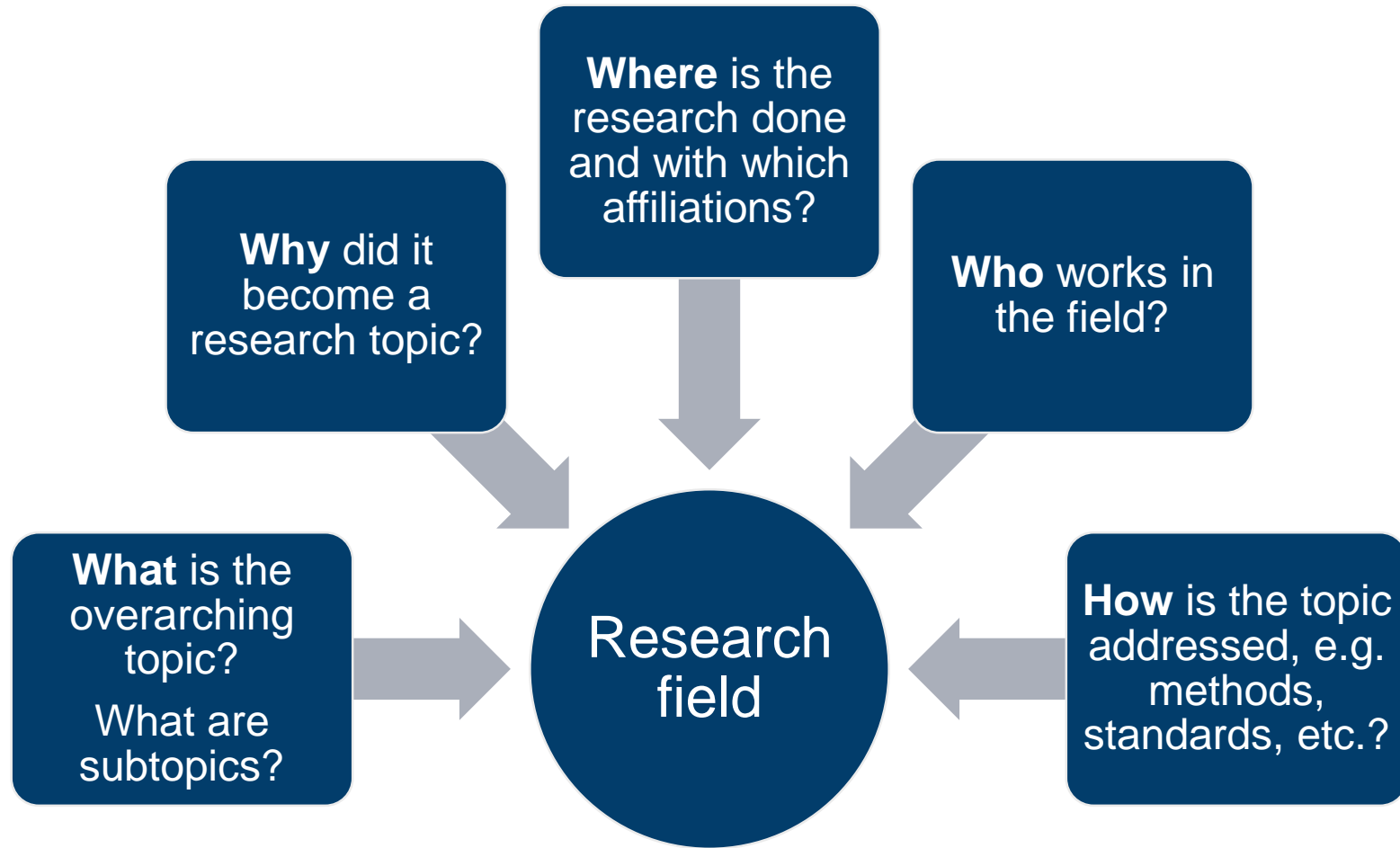
Part I



14 MAY 2025 | MONIKA HOTZE (ZB), INES SCHMAHL (ZB)

INFORMATION LITERACY IN SCIENCE

What does this mean?



INFORMATION LITERACY IN SCIENCE

What does this mean?

Searching as strategic exploration¹⁾



- For your doctoral thesis, you need a thorough understanding of your research field.
- Goal: Create a comprehensive collection of the relevant literature (and data) in the research field
- Approach: Perform a systematic literature search

¹⁾ [Framework for Information Literacy for Higher Education](#)

INFORMATION LITERACY IN SCIENCE

What does this mean?

Systematic literature search

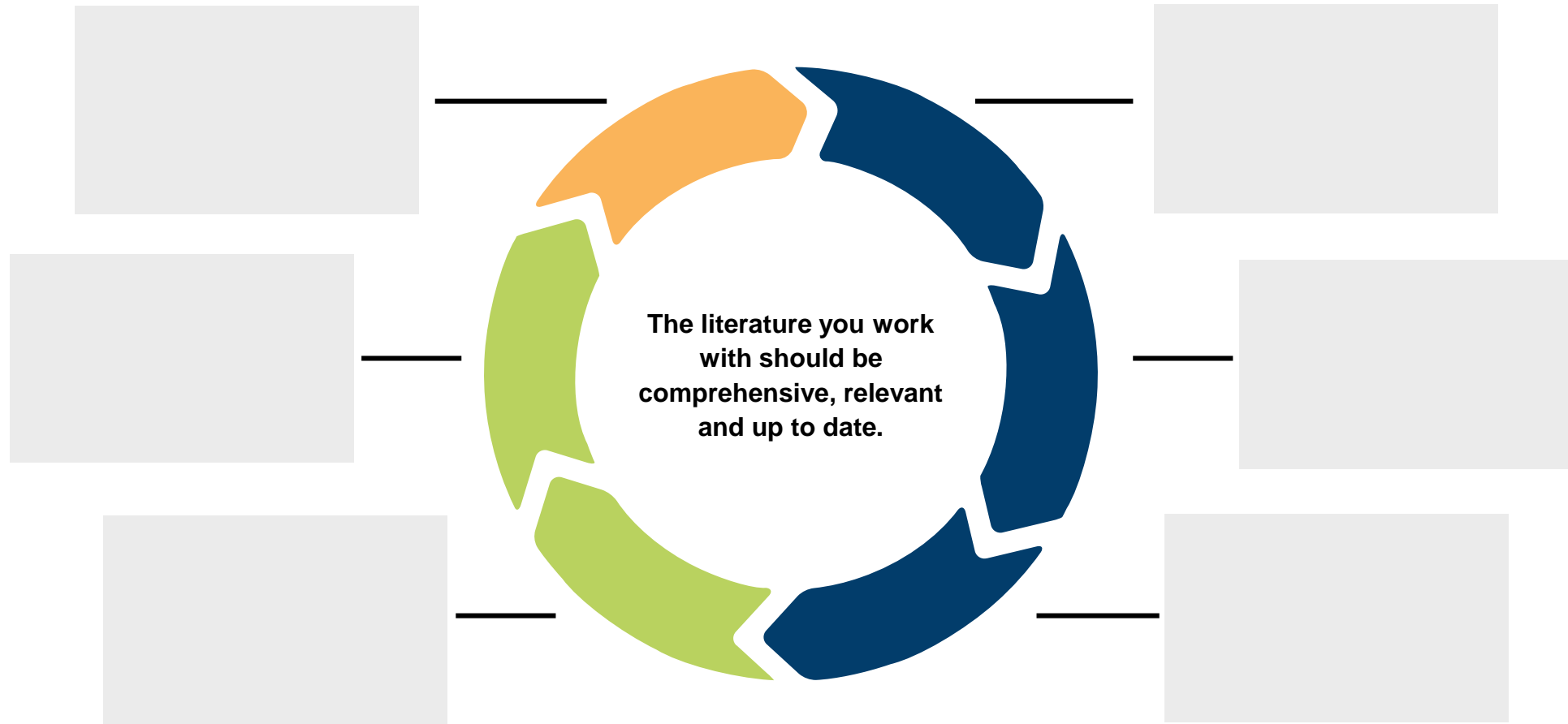


- Based on the method of a [systematic review](#)
- Systematic review: scientific method for collecting relevant literature for a research field and documentation of the result
- Comes from the field of [medicine](#)



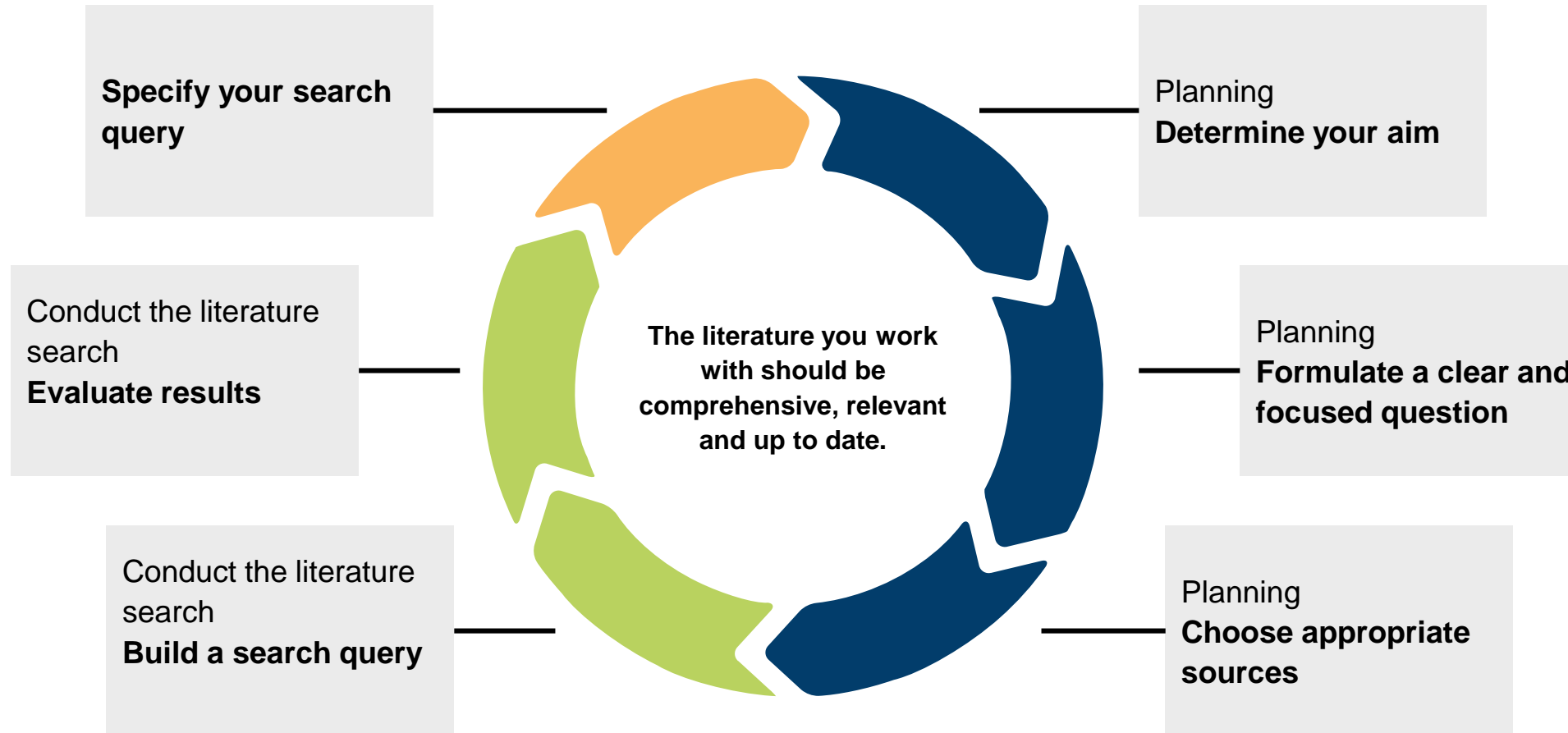
PLANNING A LITERATURE SEARCH

How to build a systematic literature search



PLANNING A LITERATURE SEARCH

How to build a systematic literature search



PLANNING A LITERATURE SEARCH

Determine your aim



PLANNING A LITERATURE SEARCH

Determine your aim



PLANNING A LITERATURE SEARCH

Formulate a clear and focused question

My research field



Topic of thesis



How can I translate these into a search query?

Think of

- Search terms
- Synonyms
- Related terms

PLANNING A LITERATURE SEARCH

Formulate a clear and focused question

Example 1

Searching for a case study on island energy systems with a focus on island microgrids.

Topic	Island energy systems
Key aspect	Island microgrids
Type of information	Case study

PLANNING A LITERATURE SEARCH

Formulate a clear and focused question

Template search terms		
Scientific Concepts	Specific Components	Additional Aspects
Island energy system	Case study	
Related terms: <ul style="list-style-type: none">• District energy system• (District) energy supply system• Energy system model	Related terms:	Related terms:
Island Microgrid	Mixed Integer Linear Programming	
Related terms: <ul style="list-style-type: none">• Microgrid• Decentralized grid	Related terms: MILP	

Source:
Reducing Computational Load for Mixed
Integer Linear Programming: An Example for a
District and an Island Energy System
https://julib.fz-juelich.de/vufind/RecordJuSER/juser_863978

PLANNING A LITERATURE SEARCH

Formulate a clear and focused question

Example 2

Searching for a cell design for hydrogen peroxide production using electrochemical synthesis.

Topic	Production of hydrogen peroxide
Key aspect 1	Electrochemical synthesis
Key aspect 2	Cell design

PLANNING A LITERATURE SEARCH

Formulate a clear and focused question

Template Search Terms		
Scientific Concepts	Specific Components	Additional Aspects
Hydrogen peroxide H ₂ O ₂	Boron-doped diamond	
Related terms: Green oxidant	Related terms: BDD	Related terms:
Electrochemical synthesis	Zero-gap PEM electrolyzer	
Related terms:	Related terms: Polymer electrolyte membrane	Related terms:

Source:
Pulsed-Current Operation Enhances H₂O₂
Production on a Boron-Doped Diamond
Mesh Anode in a Zero-Gap PEM Electrolyzer
<https://julich.fz-juelich.de/vufind/EdsRecord/edswsc.001397340100001>

PLANNING A LITERATURE SEARCH

Formulate a clear and focused question

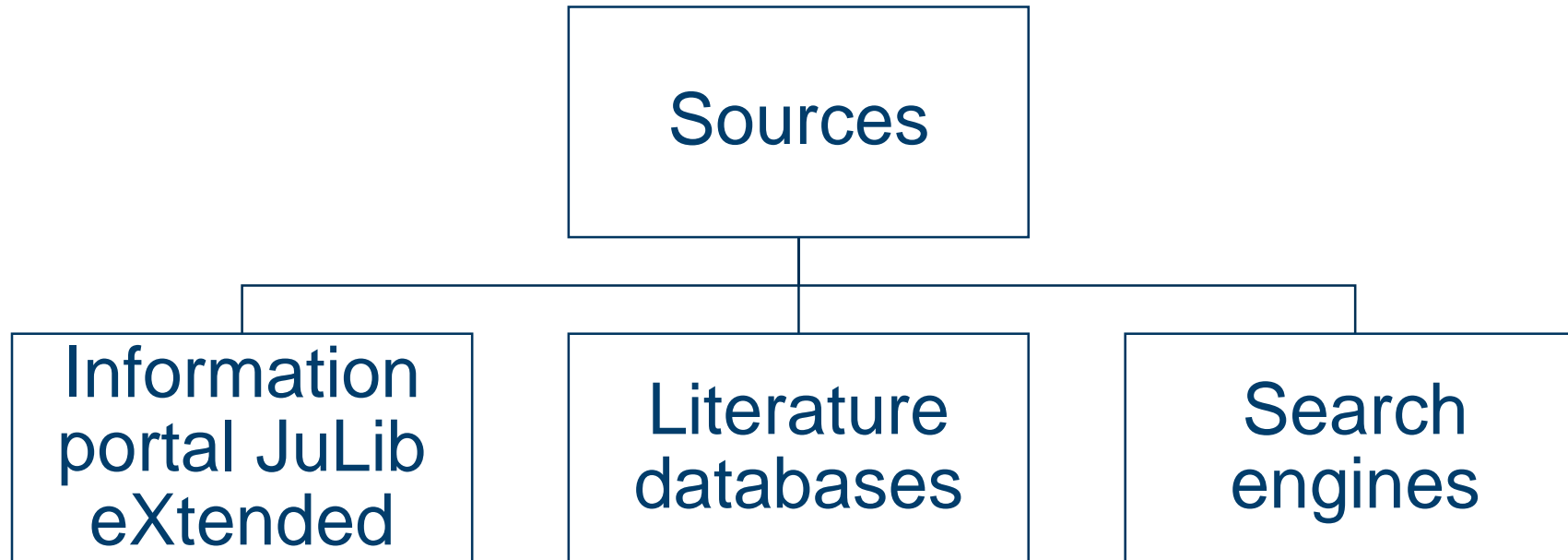
Exercise

Fill in the template:

- What are the scientific concepts in my research field? What is the overarching topic/problem of my thesis?
- What are the specific components (approaches, methods, materials) in my research project?
- What are the additional/secondary aspects?

PLANNING A LITERATURE SEARCH

Choose appropriate sources



PLANNING A LITERATURE SEARCH

Choose appropriate sources

Information portal [JuLib eXtended](#)

Access to scientific literature from the fields of natural sciences and technology



Books & more

Search ZB's collection

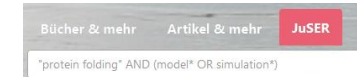
- Download electronic literature
- Order print books



Articles & more

Perform a global search

- Accessibility shown
- Download link provided
- Literature request form



JuSER - Juelich Shared Electronic Resources

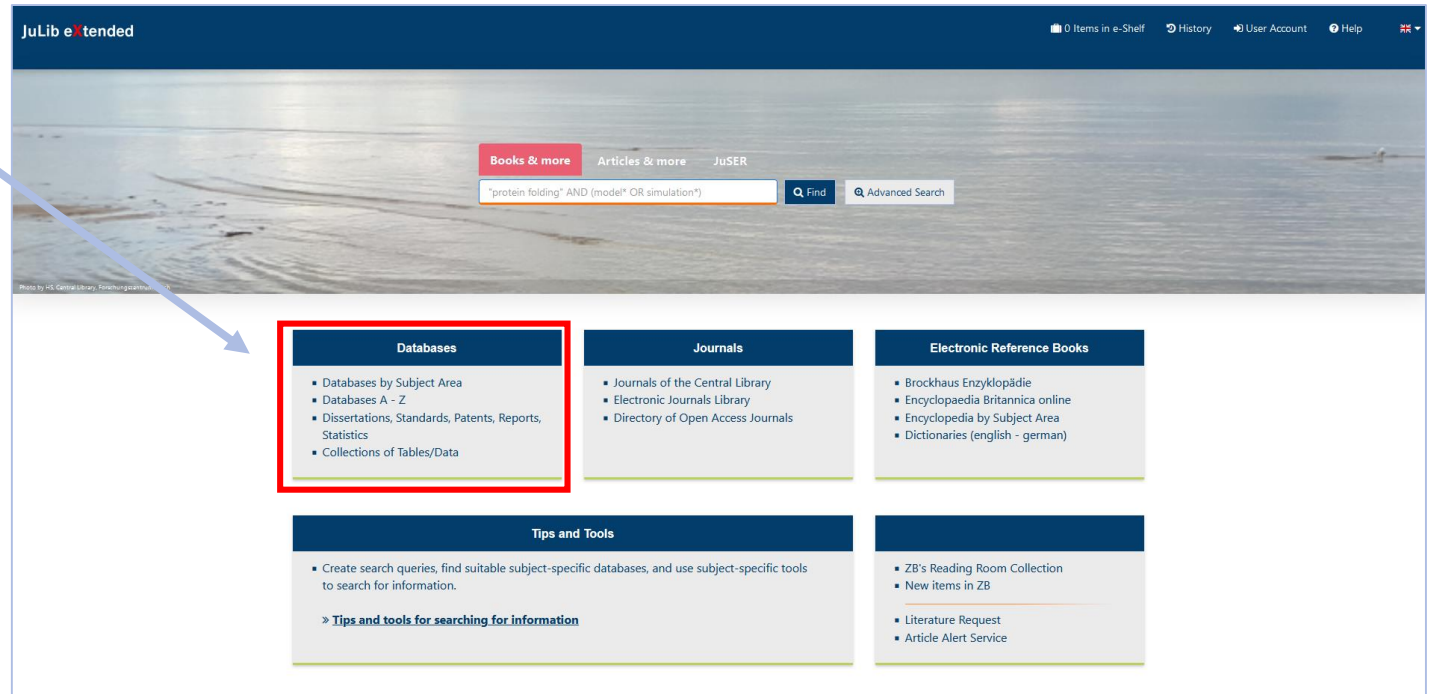
Search for publications by Jülich scientists

PLANNING A LITERATURE SEARCH

Choose appropriate sources

Literature databases

- Provide curated content
- 2 types of databases:
 - Interdisciplinary
 - Subject-specific



PLANNING A LITERATURE SEARCH

Choose appropriate sources

Database: Web of Science (<i>Core Collection</i>)	
Type	<ul style="list-style-type: none">• Bibliographic database• Link to full text Full text @ FZJ
Topics	<ul style="list-style-type: none">• Cross-discipline
Collection	<ul style="list-style-type: none">• Over 95 million bibliographic entries• Journals: over 22,000• Includes about 250 disciplines
Special services	<ul style="list-style-type: none">• Citation search and enriched cited references• Analyse results• Citation Topics
Link & Help	<ul style="list-style-type: none">• Link to database• Training portal

PLANNING A LITERATURE SEARCH

Choose appropriate sources

Database: Scopus	
Type	<ul style="list-style-type: none">• Full text and bibliographic database• Link to full text Full text @ FZJ
Topics	<ul style="list-style-type: none">• Cross-discipline
Collection	<ul style="list-style-type: none">• Over 100 million curated documents• Over 20 million research profiles• Over 94 million affiliation profiles
Special services	<ul style="list-style-type: none">• Citation analysis• Analyse results• Research data repository
Link & Help	<ul style="list-style-type: none">• Link to database• Training portal

PLANNING A LITERATURE SEARCH

Choose appropriate sources

Common document types in science

- Article (summary of a research project)
- Review article (overview of the existing literature on a research question)
- Key paper (article with a high significance for the research field)
- Thesis (bachelor/master/doctoral)
- Book, book chapter, and series
- Report
- Patent
- Standard (defined rules of technology)

Document types for conferences

- Conference proceeding
- Conference paper
- Presentation
- Poster

Further document types

- Method article/protocol
- Dataset
- Software
- Social media contributions

PLANNING A LITERATURE SEARCH

Choose an appropriate database

Exercise:

Choose one of the databases Web of Science or Scopus and conduct a search with your terms.

- Try out the filters and the analyse results feature.
- What can you find out about your research field?

CONDUCT A LITERATURE SEARCH

Build a search query

Refine the search query - options

- Combine search terms with Boolean operators
- Use keywords from the databases (controlled vocabulary)
- Add a truncation operator
- Include a phrase search

CONDUCT A LITERATURE SEARCH

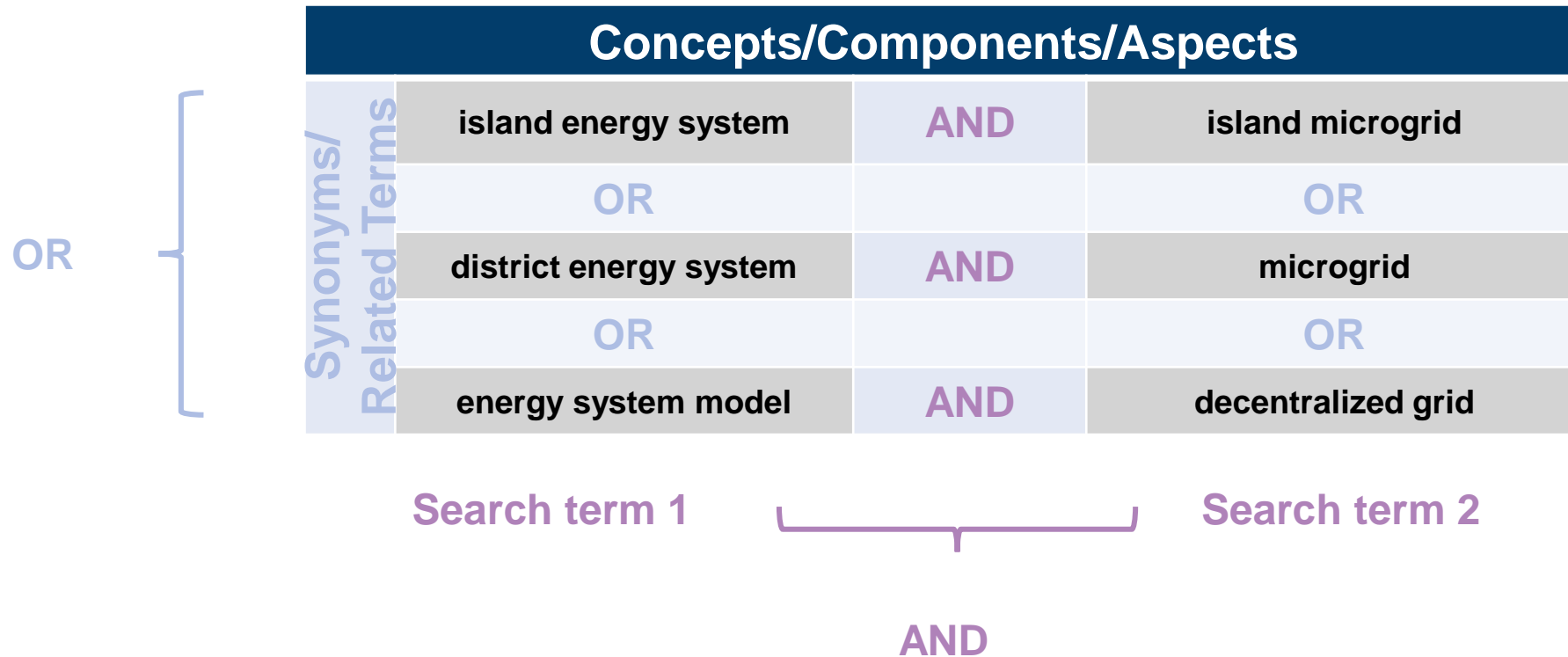
Example: Search terms

Template search terms		
Scientific Concepts	Specific Components	Additional Aspects
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Related terms: <ul style="list-style-type: none">• District energy system• (District) energy supply system• Energy system model	Related terms:	Related terms:
Island Microgrid	Mixed Integer Linear Programming	
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CONDUCT A LITERATURE SEARCH

Build a search query



CONDUCT A LITERATURE SEARCH

Build a search query

Boolean operators

- Link the search terms in databases and search engines
- Basic operators: AND and OR

AND = Intersection

Links specific components or additional aspects

→ Result set becomes smaller

OR = Join

Links synonyms

→ Result set becomes larger

Operator **AND** forms an intersection.



Operator **OR** forms a union set.



CONDUCT A LITERATURE SEARCH

Build a search query

Boolean operators: AND and OR

Combine search terms

((island energy system) OR (district energy system) OR (energy system model))

AND

((island microgrid) OR (microgrid))

CONDUCT A LITERATURE SEARCH

Build a search query

Truncation: *

Search with different word forms

((island energy system*) OR (district energy system*) OR (energy system model*))

AND

((island microgrid*) OR (microgrid*))

CONDUCT A LITERATURE SEARCH

Build a search query

Phrase search "....."

Searches for the characters in the specified order

("island energy system*" **OR** "district energy system*" **OR** "energy system model*")

AND

("island microgrid*" **OR** microgrid*)

CONDUCT A LITERATURE SEARCH

Build a search query

Proximity searching: NEARx

Searches for words in a range of 0-X words

(island **NEAR\3** energy **NEAR\3** system*)

CONDUCT A LITERATURE SEARCH

Build a search query

AND operator: island **AND** energy **AND** system

Phrase: "island energy system"

Truncation * island energy system*

Proximity search: island **NEAR\3** energy **NEAR\3** system

CONDUCT A LITERATURE SEARCH

Build a search query

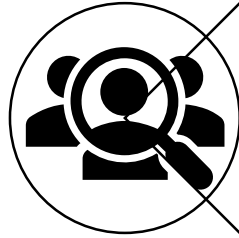
("island energy system*" **OR** (district **NEAR\3** energy **NEAR\3** system*)
OR "energy system model*")

AND

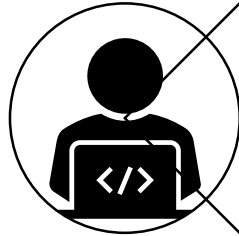
("island microgrid*" **OR** microgrid*)

CONDUCT A LITERATURE SEARCH

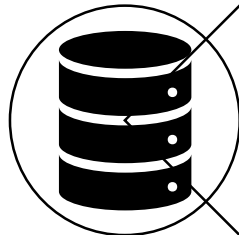
Build a search query



Own keywords



Author
keywords



Database
keywords

CONDUCT A LITERATURE SEARCH

Build a search query

Keyword search

- Terms are chosen by the user.
- Terms are searched for in the
 - bibliographic data, e.g. title, authors, keywords, abstract
 - full text (if available)

Disadvantages

- Synonyms and different spellings are ignored (depends on source).
- Search query needs many terms to find all relevant documents.
- Full text search: documents become results even if the keyword is only mentioned marginally in the text.

CONDUCT A LITERATURE SEARCH

Build a search query

Controlled Vocabulary

- Terms are fixed.
- Documents with the same content get the same terms.
- This ensures an unique standard.

Advantages

- Synonyms and different spellings are taken into account.
- Search query doesn't need many terms. It needs the sound terms.
- A controlled vocabulary is suitable for a thematic search.

CONDUCT A LITERATURE SEARCH

Build a search query

Exercise:

Refine your search query and start your search again in Web of Science or Scopus.

Use the advanced search.

CONDUCT A LITERATURE SEARCH

Web of Science – Features

Citations

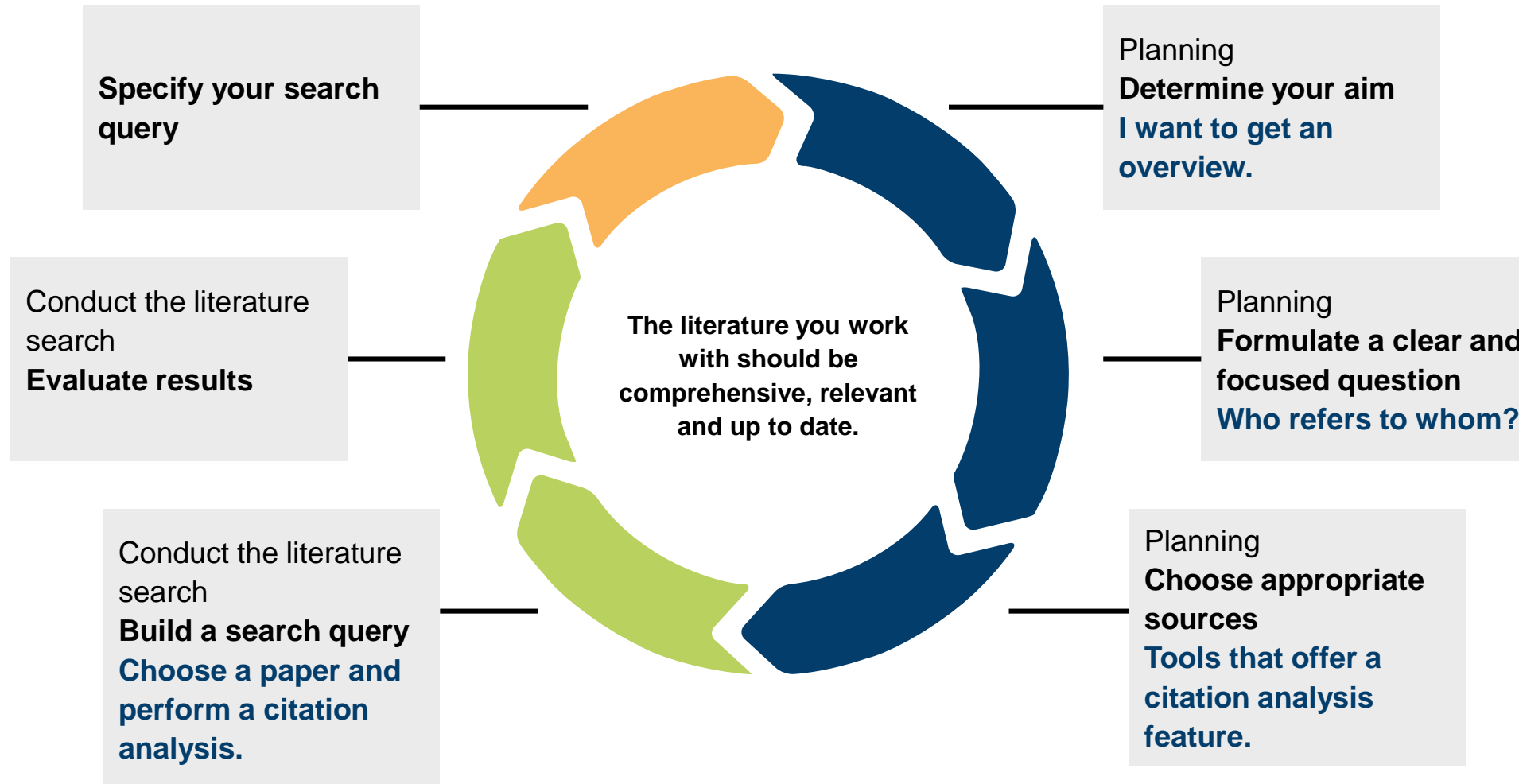
- Play an important role in science.
- Contextualize the publication in the research field.

Citations help the reader to understand

- Which literature did the authors read?
- What do the authors want to contribute to the research field?

CONDUCT A LITERATURE SEARCH

Citation analysis



CONDUCT A LITERATURE SEARCH

Web of Science – Features

Citation Search

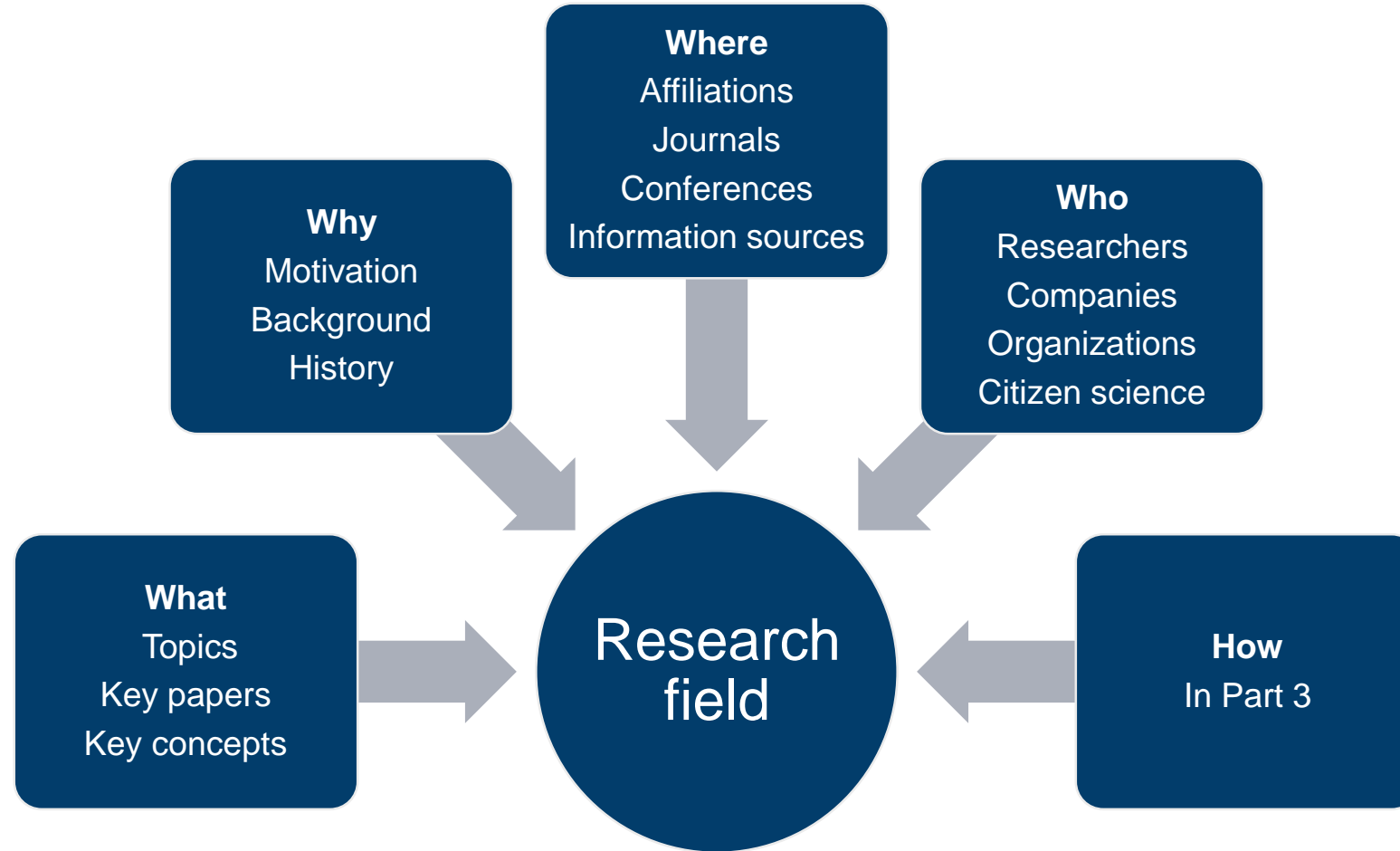
- Times cited: who cited this article?
- Cited references: which articles have been cited?
- Citations by classification

Related Records

Show all [records](#) that cite at least one of the documents cited by the parent record (cited references).

CONDUCT A LITERATURE SEARCH

Evaluate results – Do I have an overview of my research field?



MORE TOOLS

AI Tools for literature searches

- AI tools can be a helpful starting point. However, you should cite the primary sources in your work.
- AI tools can help you to find connections.
- AI tools can help you to improve search queries and find additional search terms.

Tip:

Output needs to be checked because of hallucinations (false or misleading information presented as fact).

Intranet Link ["AI Tools for Literature Searches"](#)

Talk ["Prompt or perish – the publication process in times of genAI"](#)

MORE TOOLS

Features

"Analyse" study field

Join Google Scholar and ChatGPT:
Tools like [Consensus](#) give you answers based on scientific literature.

Citation analysis

Tools like [Litmaps](#) visualize citation connections.

Text extraction

Tools like [SciSpace](#) can extract and synthesize information from papers.

MORE TOOLS

Example: Island energy system

Prompt

Context

I am a scientist working in the field of renewable energies, specializing in island energy systems.

Aim

I would like to use traditional literature databases to conduct a literature search and find all relevant literature on this topic. In preparation for this search, I would like to identify the twenty most important subtopics mentioned in the scientific literature.

Task (be specific)

Please provide me with these terms in English.

The list should be sorted hierarchically.

MORE TOOLS

Semantic Scholar

About

Semantic Scholar is a free, AI-powered research tool for scientific literature.

Provider: Allen Institute for AI

Data sources: articles from scientific publishers

Precise your search:

Use filters like *Fields of Study* or *Journals & Conferences* to narrow your result list.

Special features for papers:

- Citations by classification
- Find *Related Papers*
- Partly with AI assistant *Ask the paper*

WORKSHOP PART I

Summary

You learned

- How to perform a systematic literature search
- How to find citation networks
- What AI tools can do for you

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Central Library of Forschungszentrum Jülich

Email: zb-auskunft@fz-juelich.de

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