

Quick Reference Guide

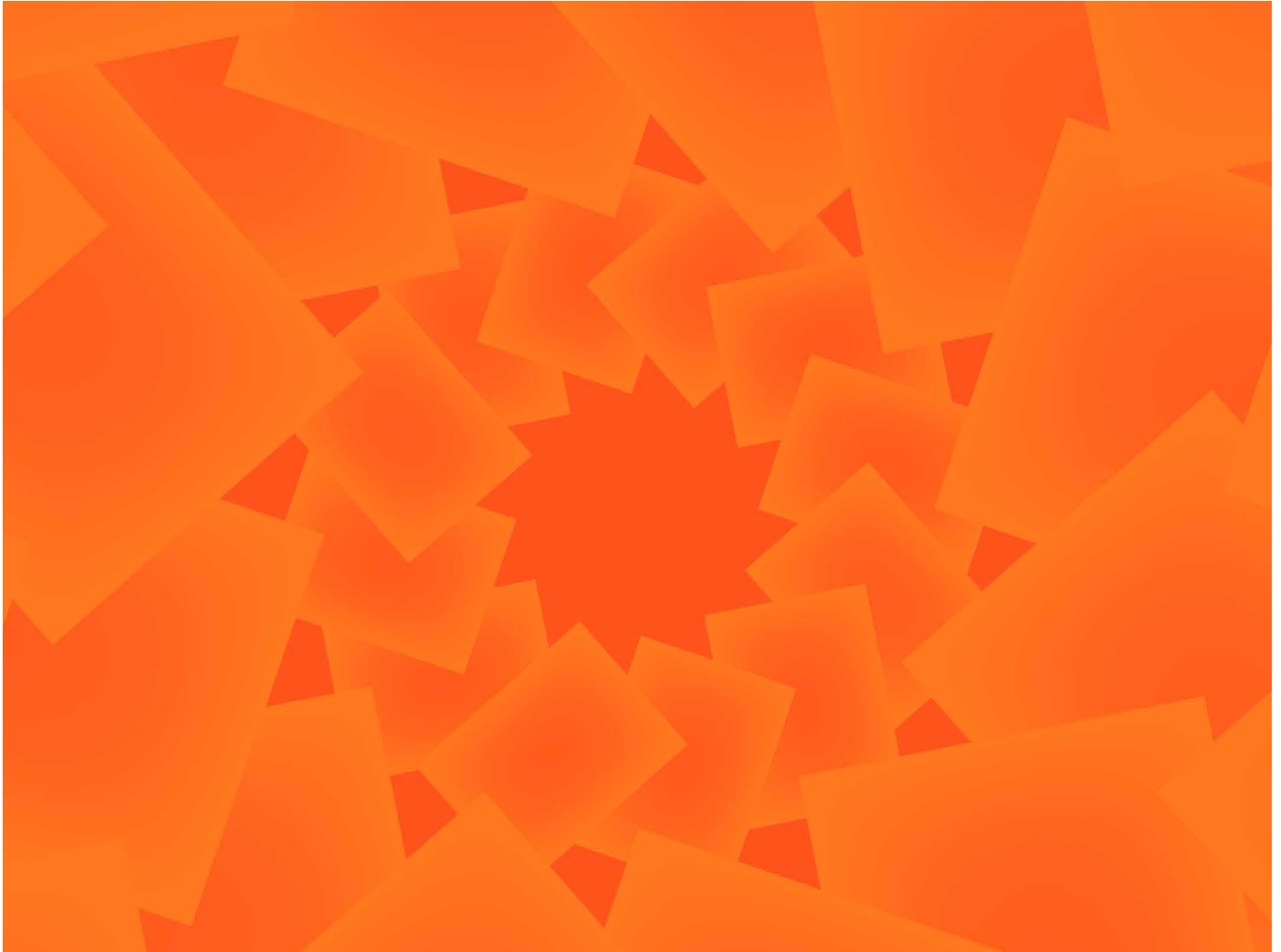
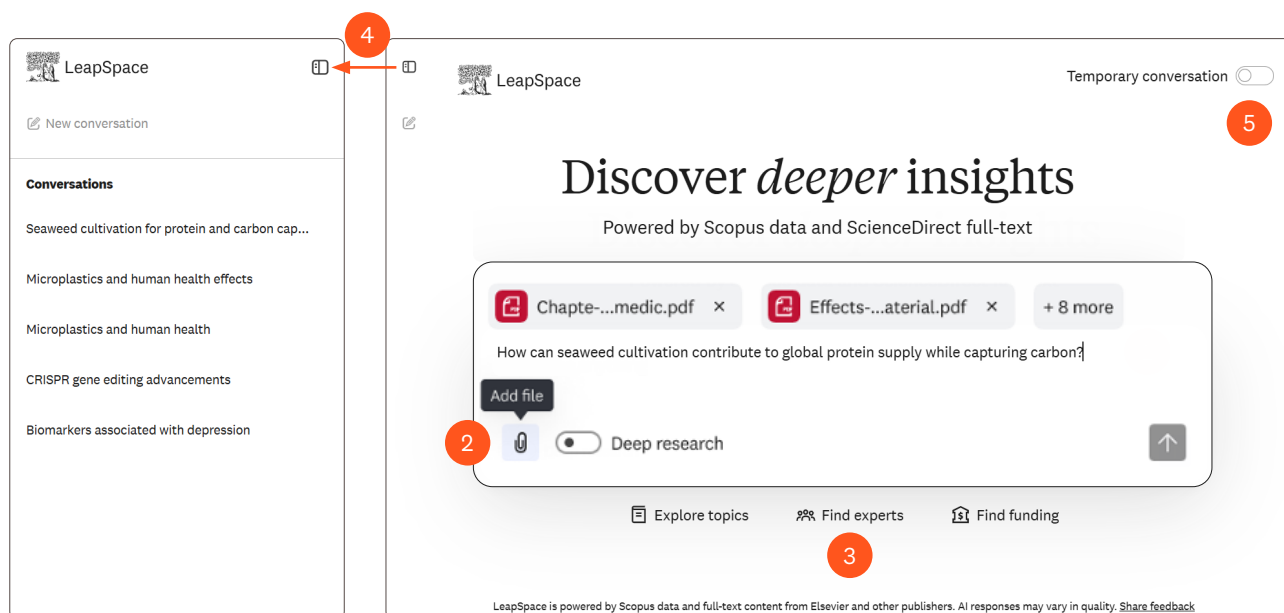


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1. Begin your search



- 1. Formulate your query:** Simply ask your question or describe your request in a natural, conversational manner. The tool supports complex research, including interdisciplinary fields.
- 2. Add your own files:** Upload up to five files per conversation and ground AI responses in both your work and the published literature.
- 3. Choose your search type:** The default search explores a topic, but you can also begin a search to find topic experts or funding.
- 4. Revisit previous queries:** Conversational history provides an overview of your previous LeapSpace searches in a tab to the left side of the screen. There you will find up to 10 of your most recent searches listed, along with an option to load older history items – LeapSpace stores up to 200 conversations in total, with a maximum of 20 exchanges per conversation.
- 5. Begin a temporary conversation:** Temporary conversation mode is designed for conducting exploratory, sensitive, or quick queries without retaining the chat history.

2. Analyzing search results

Co pilot steps ▾

- 1 **Creating a plan to respond to your query**
- Performing keyword search**
Using data from Scopus
(seaweed OR macroalgae OR kelp) AND (protein OR "biochemical yield" OR nutrit* OR amino acid*) AND (cultivat* OR farm* OR aquaculture OR mariculture)
- Performing natural language search**
Using data from Scopus
How do seaweed cultivation practices enhance protein yields and support global protein supply?
- Performing keyword search**
Using data from Scopus
(seaweed OR macroalgae OR kelp) AND ("carbon capture" OR "carbon sequestration" OR "blue carbon") AND (cultivat* OR farm* OR mariculture)
- Performing natural language search**
Using data from Scopus
How does seaweed farming enable carbon capture and long-term carbon sequestration potential?
- Performing keyword search**
Using data from Full text
(seaweed OR macroalgae OR kelp) AND (ecolog* OR environmental impact* OR habitat* OR biodivers*) AND (cultivat* OR farm* OR mariculture) AND (method* OR protocol OR "experimental design" OR result*)
- Performing natural language search**
Using data from Full text
What ecological impacts arise from large-scale seaweed cultivation systems?

Ask a follow-up question

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Seaweed cultivation for protein and carbon capture

How seaweed cultivation can expand global protein supply while capturing carbon

Seaweed farming can contribute to both **sustainable protein production** and **carbon capture**, based on strong evidence across the retrieved literature. Below is a synthesis of the clearest, most consistent findings.

Summary Table

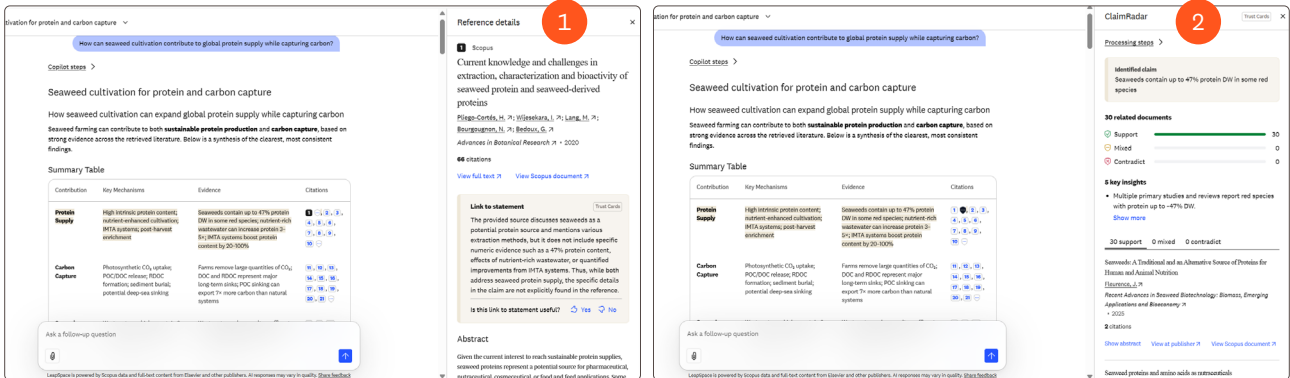
| Contribution | Key Mechanisms | Evidence | Citations |
|-----------------------|---|--|--|
| Protein Supply | High intrinsic protein content; nutrient-enhanced cultivation; IMTA systems; post-harvest enrichment | Seaweeds contain up to 47% protein DW in some red species; nutrient-rich wastewater can increase protein 3-5x; IMTA systems boost protein content by 20-100% | 1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9 , 10 |
| Carbon Capture | Photosynthetic CO ₂ uptake; POC/DOC release; RDOC formation; sediment burial; potential deep-sea sinking | Farms remove large quantities of CO ₂ ; DOC and RDOC represent major long-term sinks; POC sinking can export 7x more carbon than natural systems | 11 , 12 , 13 , 14 , 15 , 16 , 17 , 18 , 19 , 20 , 21 |
| Synergies | Wastewater → higher protein & faster growth; nutrient removal improves water quality and carbon conditions | Wastewater and aquaculture effluent increase growth and nitrogen uptake, improving both protein yield and carbon assimilation | 2 , 3 , 22 , 23 , 24 |

Ask a follow-up question

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- 1. Review the answer steps:** LeapSpace always displays the steps it takes to answer your question. This transparency builds trust and supports an essential skill in the age of AI—computational thinking or breaking a problem into parts and solving each step logically.
- 2. Examine the topic overview:** Review the structured topic overview to see the main points quickly. The Summary synthesizes content from relevant documents.
- 3. Ask a follow-up question:** You can use the follow-up feature to elaborate on specific points from the report, refocus your query to explore new perspectives, or zoom in on a particular area of interest.

3. Verify claims and reliability



- 1. Verify claims with Trust Cards:** Trust Cards help you quickly evaluate the reliability of an AI-generated insight in a LeapSpace response. When you click on a reference, a panel appears showing bibliographic details and a “Link to statement” paragraph (known as a Trust Card), which indicates how closely the claim aligns with the source. It also highlights the related section of the abstract or full text used to generate that claim.
- 2. Validate insights across the research landscape:** Claim Radar validates AI-generated insights against the broader research landscape. Builds on Trust Cards by scanning up to 40 of the most relevant sources across 100M+ Scopus-indexed papers, showing in real time whether a claim is supported, contradicted, or mixed—complete with clear visual summaries and a full evidence trail.

4. Find experts and potential collaborators

Summary Table

| Contribution | Key Mechanisms | Evidence | Citations |
|---------------------------------|---|--|--|
| Protein Supply | High intrinsic protein content; nutrient-enhanced cultivation; IMTA systems; post-harvest enrichment | Seaweeds contain up to 47% protein. DW in some red species; nutrient-rich wastewater can increase protein 3-5x; IMTA systems boost protein content by 70-100% | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 |
| Carbon Capture | Photosynthetic CO ₂ uptake; HCO ₃ ⁻ /DOC release; H ₂ O ₂ formation; sediment burial; potential deep-sea sinking | Farms remove large quantities of CO ₂ ; DOC and H ₂ O ₂ represent major long term sinks; POC sinking can export 7x more carbon than natural systems | 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 |
| Synergies | Wastewater — higher protein & faster growth; nutrient removal improves water quality and carbon conditions | Wastewater and aquaculture effluent increase growth and nitrogen uptake, improving both protein yield and carbon assimilation | 2, 3, 22, 23, 24 |
| Scalability & Limits | Global expansion potential but carbon removal often overestimated; long-term storage uncertainty; fossil fuel inputs matter | Many products re-mit carbon; net CDH depends on permanence and supply-chain decarbonization; monitoring and verification lacking | 25, 26, 27, 28 |

Who are the experts on this topic? **1**

Experts in seaweed cultivation and carbon capture

Experts on Seaweed Cultivation, Protein Production, and Carbon Sequestration
Based on the reviewed author-level results, here are the key researchers currently publishing (2020-2026) on **seaweed cultivation, macroalgal protein systems, and carbon sequestration**. Citations are taken directly from the search results.

Summary Table of Identified Experts

| Expert | Focus Areas | Affiliation | Key Evidence | Citations |
|-------------------------|--|---|---|-----------|
| Zengjie Xia | Seaweed cultivation; early-career work on macroalgae systems | The University of Tokyo (Japan) | One publication (2025) relevant to macroalgae | 38 |
| Maxine C. Canvin | Seaweed carbon sequestration; climate mitigation potential; aquaculture impacts | Dow Marine Laboratory (UK) | Multiple publications on carbon fluxes, hypoxia, and CDR modelling | 62 |
| Huaji Qiu | Macroalgae farming impacts; remote sensing for water quality; carbon system dynamics | Xiamen Lantian Space Technology Company (China) | Research on farm impacts on carbonate systems and large-scale harvest modelling | 41 |
| Yuejun Huang | Kelp growth and erosion; sediment carbon stocks; carbon sequestration | Xiamen Identity Treasure Network Technology | Studies on kelp erosion, sediment carbon, and European CDR potential | 42 |

Who are the experts on this topic? **2**

Author preview

Maxine C. Canvin **3**

Matching documents | h-index | Citations
3 | 2 | 13

[View profile](#)

Matching documents

Determining the contribution of temperate seaweed farming to local sedimentary carbon stocks and climate change mitigation
Canvin, M.C. 7; Ellis, N.G. 7; Moore, P.J. 7; Smale, D.A. 7
Marine Pollution Bulletin 71 • 2026
0 citations

Can the Emerging European Seaweed Industry Contribute to Climate Change Mitigation by Enhancing Carbon Sequestration?
Canvin, M.C. 7; Romero-Santiago, A.B. 7; Brock, T. 7; Ricart, A.M. 7; Smale, D.A. 7
Reviews in Aquaculture 71 • 2025
5 citations

Quantifying growth, erosion and dislodgement rates of farmed kelp (*Saccharina latissima*) to examine the carbon sequestration potential of temperate seaweed farming
Canvin, M.C. 7; Moore, P.J. 7; Smale, D.A. 7

- 1. Identify topic experts and potential collaborators:** Once the topic overview is complete, you can identify key people working in the field by asking LeapSpace—using the ‘Ask a follow-up question’ feature—to see the top experts or to suggest potential collaborators.
- 2. Review the list of Active contributors:** LeapSpace generates a list of people who are working in your specific topic.
- 3. Dive into expert insights:** You can deep-dive into any person on the list to review their experience and past work. This data is sourced from Elsevier's Scopus database.

5. Explore funding opportunities

The screenshot displays the LeapSpace interface. At the top, there is a 'Deep research report' header with a 'View as PDF' link. A warning message states: 'This deep research report may contain inaccuracies. Please verify the information independently.' The main title of the report is 'Optimizing Protein Yield and Biochemical Mechanisms in Seaweed Species Under Variable Nutrient and Light Conditions'. Below the title is a 'Quick Reference' section containing a 'Key findings table'.

| Species | Protein Content (% DW) | Key Mechanisms/Notes | References |
|-----------------------|------------------------|---|------------|
| Psychiatric disorders | 20-25 (extract) | Efficient N assimilation (nitrate/ammonium), high protein recovery with pH-shift extraction | 1 2 3 |
| Palmaria palmata | 28 | High yield with enrichment, effective post-harvest processing | 4 |
| Macrocystis pyrifera | 22.5 | Cooler temps, balanced photoperiod optimize protein and amino acid synthesis | 5 6 |
| Hypnea cervicornis | 21 | Accumulates protein/ phycobiliproteins under balanced high nutrients | 7 |
| Porphyra umbilicalis | 22.6 (extract) | High growth/protein at moderate temp, high light; pH- | 8 9 |

Below the table is an 'Ask a follow-up question' input field with a 'Deep research' toggle switch and an upward arrow icon. At the bottom of the interface, a small note reads: 'Researcher AI beta, is powered by Scopus and ScienceDirect. Expect variation in response quality. Share feedback'.

On the right side, a 'Deep Research steps' sidebar is visible, containing a list of steps numbered 1 through 9. Step 1 is highlighted with a red circle. The steps describe the process from analyzing the research topic to searching for semantically relevant information.

- 1. Inquire about funding:** To find out who is funding research in this topic, use the 'Ask a follow-up question' feature.
- 2. Review funding sources:** You can see a list of the major funding sources for this area of research.
- 3. Identify specific funding opportunities:** You can drill down into specific funding opportunities that are behind each funder, which may be a source of funding for you.

6. Create a report of your findings

Summary table of identified experts

| Expert | Focus Areas | Affiliation | Key Evidence | Citations |
|------------------|--|---|---|--------------------|
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| Youjun Huang | Kelp growth and erosion; sediment carbon stocks; carbon sequestration potential in seaweed farms | Xiamen Identity Treasure Network Technology Company (China) | Studies on kelp erosion, sediment carbon, and European CDR potential | 42 |
| Unknown Author | Seaweed-fish polyculture impacts; carbon sequestration limits due to fish farming inputs | N/A | Publications on hypoxia, acidification, and carbon flux disruptions | 43 |

'Could you make a short report for my team about this, and include a diagram?'

1

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Request for a report on seaweed cultivation

Below is a concise, structured report synthesising only the information from our previous discussion, with a diagram included. All claims are tied to the cited sources.

Short Report: Seaweed Cultivation for Protein Supply and Carbon Capture

This report summarises how seaweed cultivation can simultaneously expand global protein availability and contribute to carbon capture, based entirely on the previously retrieved evidence.

1. Why Seaweed Matters for Protein Supply

Seaweeds—especially red species—contain **high protein levels (20–47% dry weight)**, offering all essential amino acids required for human diets [1](#) [5](#) [8](#).

Key mechanisms that increase protein yield include:

- **Nutrient-rich wastewater cultivation**, which increases growth and protein content by **3–5×** [2](#) [3](#) [4](#).
- **Integrated Multi-Trophic Aquaculture (IMTA)**, which enhances protein content by **20% or more** and stabilises biomass quality [6](#).
- **Biorefinery approaches** that allow extraction of multiple protein-rich fractions from the same biomass [6](#).

Global projections indicate that by **2054**, seaweed could supply **56 million metric tons of protein**, equal to **18% of the global alternative protein market** [29](#).

2. Carbon Capture Contributions

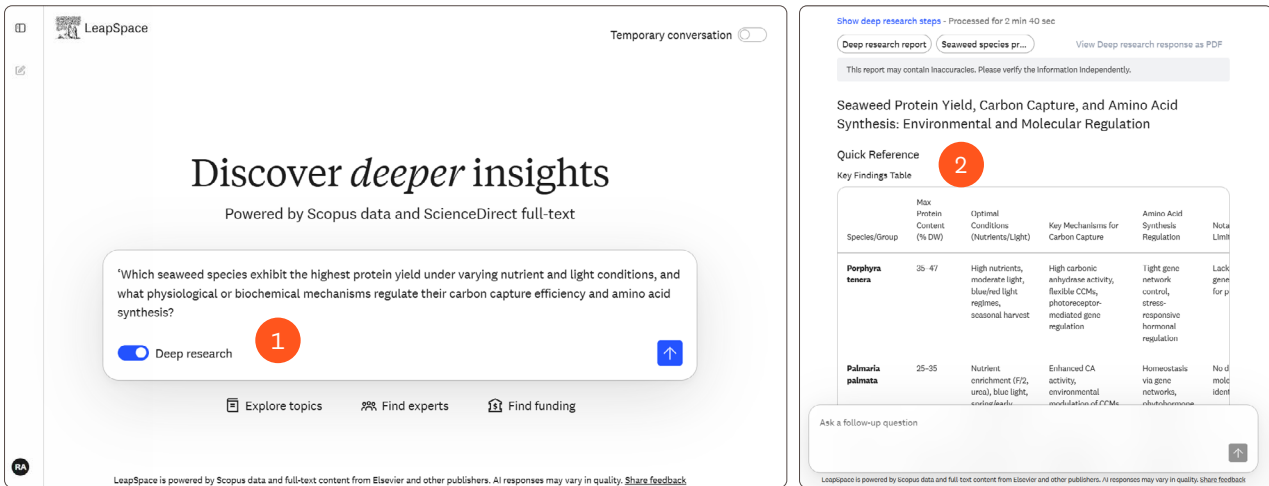
Seaweed farms remove dissolved CO₂ through photosynthesis and convert it into biomass carbon [14](#) [16](#). Carbon capture occurs through:

Ask a follow-up question

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- 1. Generate a report:** Use the 'Ask a follow-up question' feature to create a report to share key findings with your team
- 2. Analyze the report:** LeapSpace uses the previous turns as context and generates a structured report, including a diagram. It also pulls in the associated references from the earlier steps — combining everything found in one place.

7. Generate a Deep Research Report



- 1. Develop a comprehensive, well-reasoned report:** Deep research takes your exploration a step further—producing comprehensive, well-reasoned reports in minutes. When you pose a question, Deep research goes beyond summarizing existing information—it develops a detailed research plan, conducts extensive searches across the curated literature in LeapSpace, and refines its approach as new insights emerge.
- 2. Analyze the report overview:** Quickly review a structured, fully referenced summary—including key findings, a direct answer to the query, study scope, assumptions and limitations, synthesis and discussion, future research directions, conclusions, and recommended reading.

