



Ministry of Higher Education and Scientific Research
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1st year

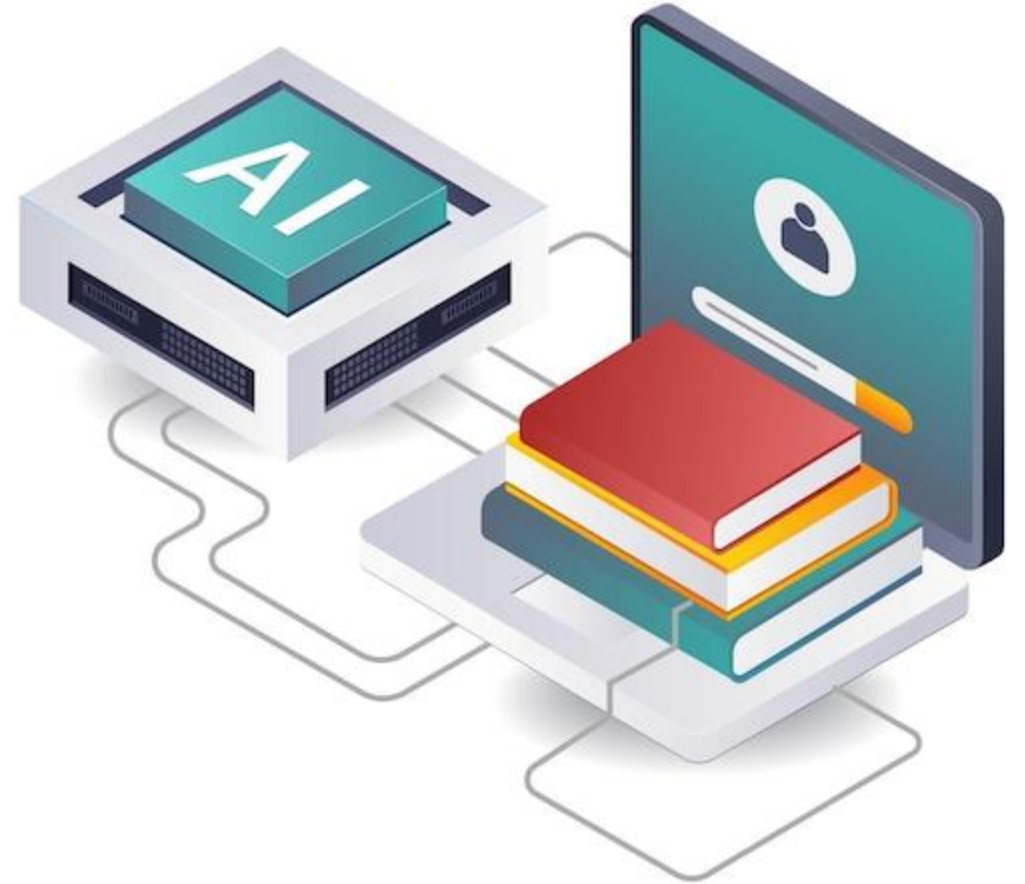
Introduction to Artificial Intelligence

Dr. N.CHALABI

February 2026



AI for Academic Research

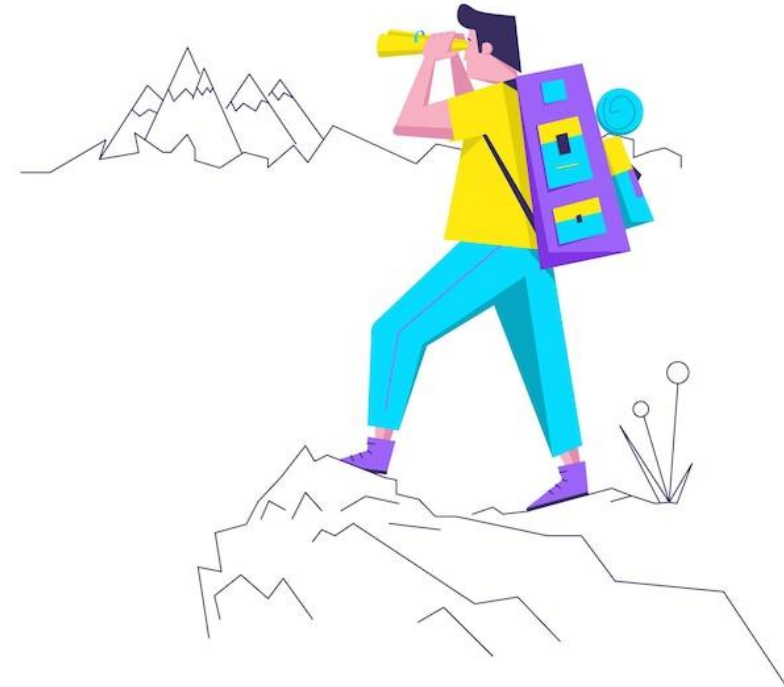


In previous chapters:

- What is AI?
- Types of AI
- Advantages and Risks

Now we explore:

 How AI helps us **search**, **analyze**, and **understand** scientific information.



Why Use AI in Research?

Modern research faces:

- Information overload
- Thousands of scientific papers
- Complex terminology
- Time-consuming literature reviews

AI tools help researchers:

- Search faster
- Understand better
- Organize knowledge efficiently

AI Tools for Academic Research



Elicit (AI Research Assistant)



What it does:

- Searches academic papers
- Summarizes research findings
- Extracts key information
- Helps structure literature reviews

Technology behind it:

- Natural Language Processing (NLP)
- Large Language Models
- Semantic search (search by meaning, not only keywords)



elicit



Mode IA

Tous

Images

Vidéos

Actualités

Vidéos courtes

Web

Plus ▾

Outils ▾



Elicit

<https://elicit.com> · [Traduire cette page](#) ·

Elicit: AI for scientific research

Use AI to search, summarize, extract data from, and chat with over 125 million papers. Used by over 2 million researchers in academia and industry.

AI for Academic Research

Elicit automates research so that you can make novel ...



Paper Search

Save time finding scientific papers and evidence with Elicit's AI ...



Sign up

Sign up. Already have an account? [Sign In](#). [Continue with Github](#) ...



Pricing

Use AI to search, summarize, extract data from, and chat with ...



Systematic Literature Reviews

Elicit helps accelerate every step of a systematic review · [Refining](#) ...



[Autres résultats sur elicit.com »](#)

Popular workflows

Research report

Systematic review

Tools

Find papers

Paper chat

Extract data

Agents BETA

Competitive landscape

General research agent

Ask a research question to generate a structured research report automatically

Try a couple of free examples to see what this is all about

GLP-1R mechanisms

Magnesium effects on sleep

Online vs. in-person CBT

Source Research papers

→

Recents			View all
	Multiobjective Multipopulation Optimization Study	Notebook	10:03am Apr 24
	Extracted data from 1 paper		4:47pm Jan 22
	Extract data from PDFs		
	multiobjective optimization		11:05pm Jan 8
	Find scientific research papers		

Magnesium's Role in Sleep and Stress

Research report View only

< Create alert

FEBRUARY 26, 2025

What is the impact of magnesium on sleep and stress?

Daily magnesium supplementation demonstrates significant benefits for both sleep quality and stress reduction through improvements in sleep metrics and stress-related biomarkers.

ABSTRACT

Magnesium supplementation is reported to improve sleep quality and reduce physiological markers of stress. * In studies with elderly patients experiencing insomnia, daily doses of approximately 500 mg for eight weeks led to significant decreases in Insomnia Severity Index scores and improvements in sleep efficiency, sleep onset latency, and total sleep time ($p < 0.05$). * In adults with nonclinical insomnia symptoms and those with poor sleep quality, significant improvements in Pittsburgh Sleep Quality Index scores, deep sleep duration, and other sleep architecture measures were documented (p values ranging from <0.05 to <0.0001). *

Among stress indicators, multiple trials reported significant reductions in serum cortisol ($p \leq 0.01$) along with increases in renin and melatonin or improvements in heart rate variability measures. * Studies using inflammatory markers also observed decreased plasma C-reactive protein in subjects with high baseline values ($p < 0.0001$). * Doses in these trials ranged from 300 to 1,000 mg daily over intervention periods from two to eight weeks, and few adverse events were noted (one study observed only mild soft stools). *

Report

Status

✓ Gather sources
499 sources found

Details

✓ Screen sources
14 sources included

Details

✓ Extract data
98 data points extracted

Details

✓ Generate report

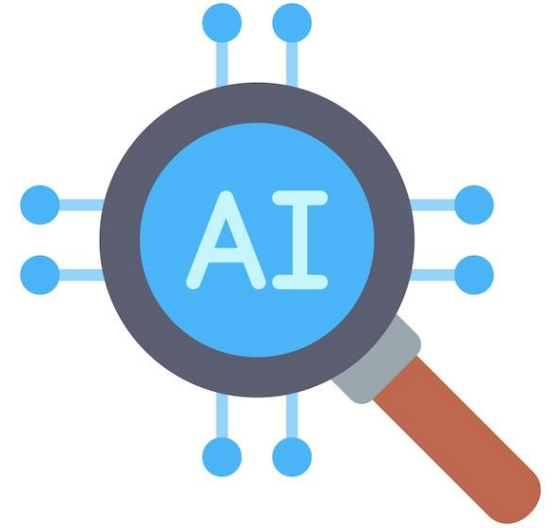
Generate PDF



Chat

Sample reports currently do not support chat.
Generate your own report or open one that's been shared with you to use chat

Example of AI-Assisted Search



Traditional search:

- “AI education”

Improved AI-based query:

- “What are the effects of AI tools on student performance in higher education?”

AI provides:

- Relevant papers
- Research methods
- Key results
- Structured summaries

Scopus AI

Scopus AI

- AI-powered academic search
- Generates research summaries
- Suggests related papers
- Identifies research trends

Advantages:

- Peer-reviewed sources
- Structured scientific database
- Reliable academic content

What is included in a Scopus AI response?



Summary

A high-level, fully referenced Summary that includes guidance on the tool's confidence in the response



Expanded summary

An extended referenced summary that explores each query from multiple perspectives



Go deeper questions

A series of prompts designed to help you continue exploring and learning



Concept map

A clickable visual that uses keywords to provide a bird's-eye view of the topic space



Foundational documents

A list of influential articles that inspired the articles cited in the summaries



Topic experts

The top researchers in your chosen field (based on their volume of related publications)



Emerging themes

A topic overview that helps you identify the research themes in your field of interest – including potential areas of opportunity



Conversational Follow up

A free text field that enables you to enter follow-up questions and keep digging deeper



Conversational History

An automated list of all your previous queries so you can resume an existing search at any time



Scopus



Search

Sources

SciVal ↗



JT

Start exploring

Documents

Authors

Researcher Discovery

Organizations

Scopus AI

New

Search tips ?

Search within

Article title, Abstract, Keywords



Search documents *

+ Add search field



Add date range

Advanced document search >

Search



Summary with Scopus references

Save time with a quick summary for topics of interest. Scopus AI gives you a concise and trustworthy summary with academic references for each search.

Start exploring

Documents Authors Researcher Discovery Organizations **Scopus AI**

Explore new topics and discover relevant references from 2013 [How it works](#)

What would you like to learn more about?

Influence of seismology on civil engineering d|



Search examples

- ↳ What role does multisensory integration play in the formation of emotional memories?
- ↳ How do urban green spaces contribute to mental well-being?
- ↳ How can game theory be applied to corporate compliance programs?

Expanded summary

Based on the user's query, I will address the ecological effects of microplastic pollutants on marine biodiversity in coastal regions, the impact of microplastic pollutants on the food web in coastal marine ecosystems, the long-term consequences of microplastic pollution on coastal marine biodiversity, and the mitigation strategies for reducing the impact of microplastic pollutants on marine biodiversity in coastal regions.

Ecological Effects of Microplastic Pollutants on Marine Biodiversity:

- Microplastics are pervasive in marine ecosystems and pose a significant threat to marine organisms and ecosystems [1](#) [2](#) [3](#).
- Studies have shown that microplastics can cause physical and chemical risks to marine organisms, leading to alterations in behavior and survival rates [2](#).
- Research has demonstrated that microplastic consumption can affect the survival and behavior of marine organisms, such as beachhoppers, which may have flow-on effects to their local environment and higher trophic levels [2](#).

Impact of Microplastic Pollutants on the Food Web in Coastal Marine Ecosystems:

- Microplastics are ingested by a wide range of marine organisms, causing physical damage and physiological stress, which can interfere with feeding, growth, and reproduction, leading to adverse effects on marine populations [3](#).

Scopus AI generates three Go deeper questions for each query that is designed to help you drill down and broaden your understanding.

Go deeper

- ↳ How do microplastic pollutants affect the feeding habits of marine organisms in coastal regions?
- ↳ What are the potential long-term consequences of microplastic pollution on the genetic diversity of marine species in coastal areas?
- ↳ How do microplastic pollutants impact the reproductive success of marine organisms in coastal ecosystems?

Ask a follow-up question



Enter follow-up questions and refine your thinking to:

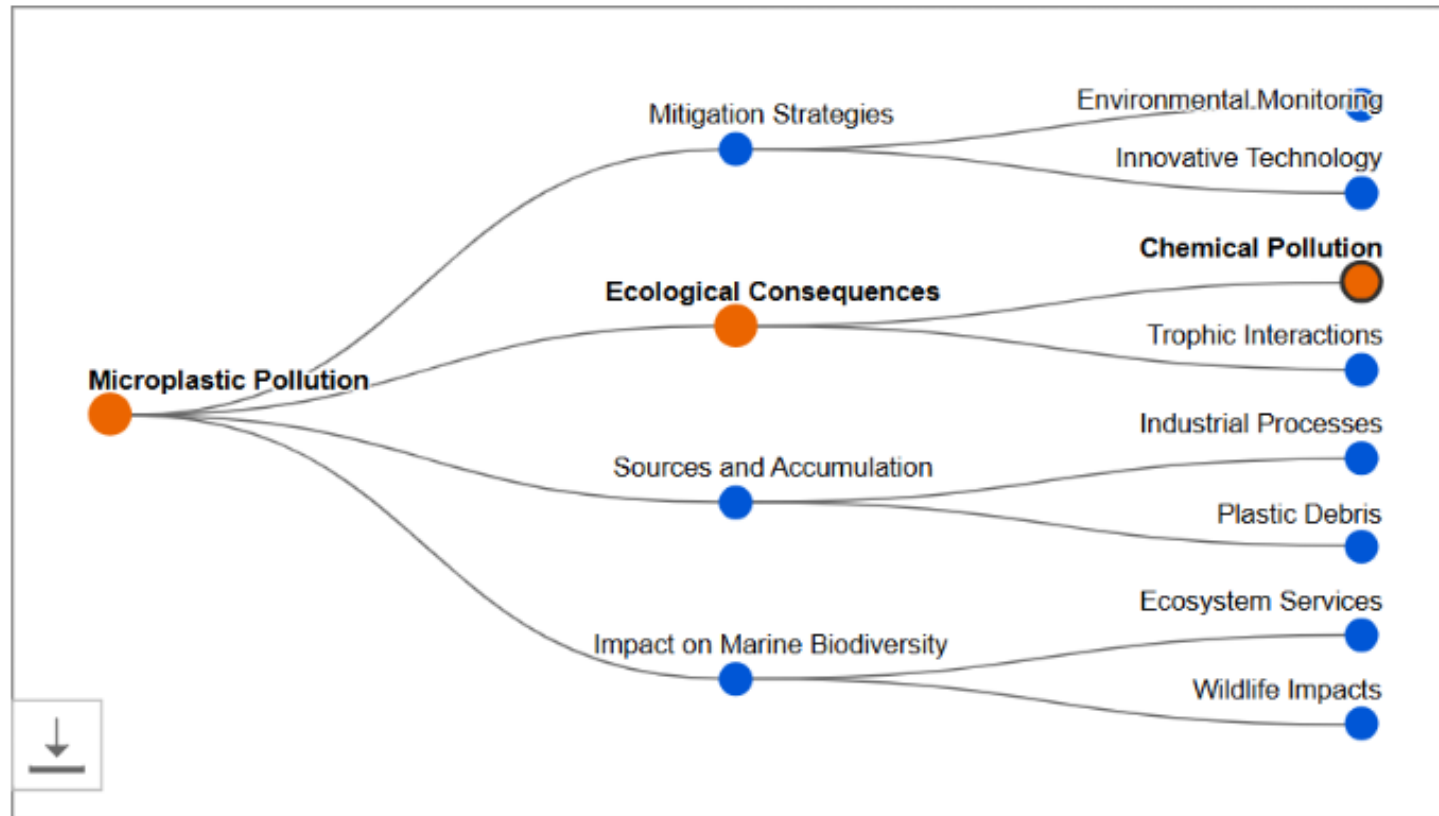
- Refocus your query to explore new perspectives without starting over
- Zoom in on specific areas of interest to improve clarity and precision in your understanding

Ask a follow-up question



The **Concept map** is designed to help you get a bird's-eye view of the topic space and a more complete picture of your theme and its relationship to other research areas.

Clicking on a node will highlight how the node relates to the topic, and an explanation of the relationship will be provided beneath the Concept map.



The list of **Foundational documents** illustrates which papers heavily influenced the documents that Scopus A to write its response, specifically the Summary.

Foundational documents

5,838 citations

Microplastics in the marine environment

A.L., Andrady, Anthony L.

3,970 citations

Microplastics in the marine environment: A review of the methods used for identification and quantification

V., Hidalgo-Ruz, Valeria, L., Gutow, Lars,

R.C., Thompson, Richard C., M., Thiel, Martin

Environmental Science and Technology ↗ 2012

[Show more documents](#)

Meet the experts

Scopus AI draws on the rich Author Profiles in Scopus to introduce the most active authors in your chosen field, along with explanations of their relevant expertise.

Topic experts



Belal Hossain, Mohammad Belal M.B.

2,861 citations **8** matching documents **30** h-index

Mohammad Belal Hossain is a recognized expert in the field of microplastic pollution, particularly in coastal ecosystems. Their recent work focuses on the contamination and ecological risks associated with microplastics in various habitats along the Bay of Bengal coast. By examining the retention efficiency of microplastics in different environments, they provide valuable insights into how these pollutants affect marine biodiversity. Their research also includes risk assessments of microplastics in fish species, highlighting the potential impacts on marine life and food webs. This comprehensive approach to studying microplastics positions them as a key contributor to understanding the broader implications of plastic pollution on coastal biodiversity.

[Preview profile](#)

Identify new & trending research opportunities

Emerging themes is a new feature that is designed to help identify and categorize consistent, rising, and novel themes based on Scopus AI user queries.

It uses a new proprietary algorithm that rapidly scans Scopus documents from the last two years and clusters them by topic. This process effectively pinpoints “white space” that you can target for publications, collaborations, and funding opportunities.

For each identified theme, Emerging themes identifies the type of theme and provides a mini-summary, references, and suggested research hypotheses.

This feature can be valuable to a range of researchers helping them stay ahead of the curve and identify novel research areas.

 Scopus AI

Potential Hypotheses:

- Microplastic pollution exacerbates coral bleaching events by increasing the stress on coral polyps
- The presence of microplastics in coral reefs disrupts the symbiotic relationship between corals and zooxanthellae, leading to reduced coral growth and resilience

Microplastics in Freshwater Systems and Their Impact on Marine Biodiversity Rising Theme

Research on microplastics in freshwater systems is expanding, with a focus on their sources, environmental impacts, and removal strategies. This theme is crucial as freshwater systems often serve as conduits for microplastics entering marine environments, thereby affecting marine biodiversity. Understanding the dynamics of microplastics in freshwater can inform mitigation efforts to protect marine ecosystems.

Show references

Potential Hypotheses:

- Microplastics originating from freshwater systems significantly contribute to the decline in marine biodiversity

Ask a follow-up question

Scopus AI's quality of results may vary. [How it works](#)

Share feedback

Feedback

Web of Science Research Assistant

Web of Science Research Assistant

- AI-powered literature exploration
- Citation network analysis
- Research mapping
- Identifies key authors and influential papers

Helps :

- Discover high-impact research
- Understand how research evolves over time



MENU

[History](#)

Start a new chat by asking a question

Ask a research question



Choose a guided task:



Understand a topic

Walk through understanding key concepts, papers and authors on a topic to quickly become an expert.



Literature review 2.0

Gather and evaluate references while being guided through the phases of literature review.



Find a journal

Find the right journals to publish your work in.

Example questions:

How does climate change impact biodiversity?



Who are the most cited authors in genetics?



Which institutions published the most on covid in the last 12 months?



¿Cuáles son las consecuencias físicas de seguir una dieta vegana?



Can you find recent studies on super-resolution microscopy?



线粒体在癌症中扮演什么角色?



Start your literature review

Tell the Research Assistant about the topic or task for your literature review



 Create detailed literature review

 Identify research gaps

 Find hotspots

 Formulate hypothesis



Create a detailed literature review about biodiesel production

US



To create a detailed literature review on biodiesel production, we need to refine the query to focus on specific subtopics or areas within biodiesel production, such as:

1. Feedstock sources for biodiesel production
2. Technologies and methods used in biodiesel production
3. Environmental impacts of biodiesel
4. Economic aspects of biodiesel production

Please let me know if there are specific subtopics you are interested in or if you would like to explore all of them.



History



3

US



Great! We'll focus on the environmental impacts of biodiesel production. Here's a proposed search strategy:

1. **Main Topic:** Environmental impacts of biodiesel production

2. **Subtopics and Synonyms:**

- Environmental impacts/effects
- Biodiesel production
- Emissions
- Sustainability
- Life cycle assessment (LCA)
- Ecological footprint

Would you like to refine any of these subtopics or add more?

↑ Back to top

Reply



How are these results generated? ▲

Overview:

The impact of climate change on biodiversity is multifaceted, involving shifts in species distribution, alterations in genetic diversity, and the degradation of ecosystem services. Key themes include "species distribution shifts", "genetic diversity loss", and "ecosystem service disruption".

Species distribution shifts:

- Climate change is causing significant range shifts in species towards higher altitudes and latitudes, leading to potential extinctions and altered community dynamics ¹⁻⁴.
- The distribution of species is increasingly influenced by both natural climatic variations and anthropogenic factors, such as habitat destruction and land-use changes ⁷⁻²⁰.
- Historical climate fluctuations have shaped current species distributions, suggesting that understanding past responses can inform predictions about future changes ²¹⁻¹⁹.

Genetic diversity loss:

- Climate change is linked to declines in genetic diversity within species, which can compromise their adaptability and resilience to environmental changes ²⁻⁵.
- Increased climate variability has been shown to reduce genetic diversity in plant populations, affecting community dynamics and ecosystem processes ¹⁴⁻²².
- The loss of genetic diversity can have cascading effects on ecosystems, particularly for foundation species that play critical roles in maintaining ecological balance ²³⁻²⁴.

Ecosystem service disruption:

- Climate change and habitat degradation are leading to significant declines in ecosystem services, which are vital for human well-being ⁴⁻¹⁰.
- The alteration of species interactions and community structures due to climate change can disrupt the functioning of ecosystems, affecting their ability to

I have used the document information and abstracts from 25 of these to answer your query and introduce you to the relevant research. You can view more about the documents by clicking the references in the response. To view the full set of results, click on 'View all results in Web of Science Core Collection' at the end of the list.

View 25 referenced documents



1 Vulnerability of global biodiversity hotspots to climate change

Trew, BT and Maclean, IMD

APR 2021 | GLOBAL ECOLOGY AND BIOGEOGRAPHY

161

Citations

Co-citation map

Citing items by classification chart

2 Cryptic biodiversity loss linked to global climate change

Bálint, M; Domisch, S; (...); Nowak, C

SEP 2011 | NATURE CLIMATE CHANGE

302

Citations

Co-citation map

Citing items by classification chart

3 The pace of biodiversity change in a warming world

Sunday, JM

APR 2020 | NATURE

18

Citations

Co-citation map

Citing items by classification chart

4 The biotic effects of climate change

Lister, AM

FEB 2009 | CLINICAL MEDICINE

5 Influence of Climate Warming on Arctic Mammals? New Insights from Ancient DNA

45

Co-citation map

Climate change significantly impacts biodiversity through shifts in species distributions, loss of genetic diversity, and disruption of ecosystems. Addressing these challenges requires a comprehensive understanding of ecological dynamics and proactive conservation strategies to mitigate the adverse effects of climate change on global biodiversity.

   Copy Text

I have used the document information and abstracts from 25 of these to answer your query and introduce you to the relevant research. You can explore more documents by clicking the references in the response. To view the full set of results, click on 'View all results in Web of Science Core Collection'.

View 25 referenced documents

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 Co-citation map

Vulnerability of global biodiversity hotspots to climate change

 Highly Cited  Early Access  Review Article

[View full record](#)

[Save](#)

Authors

Trew, BT and Maclean, IMD

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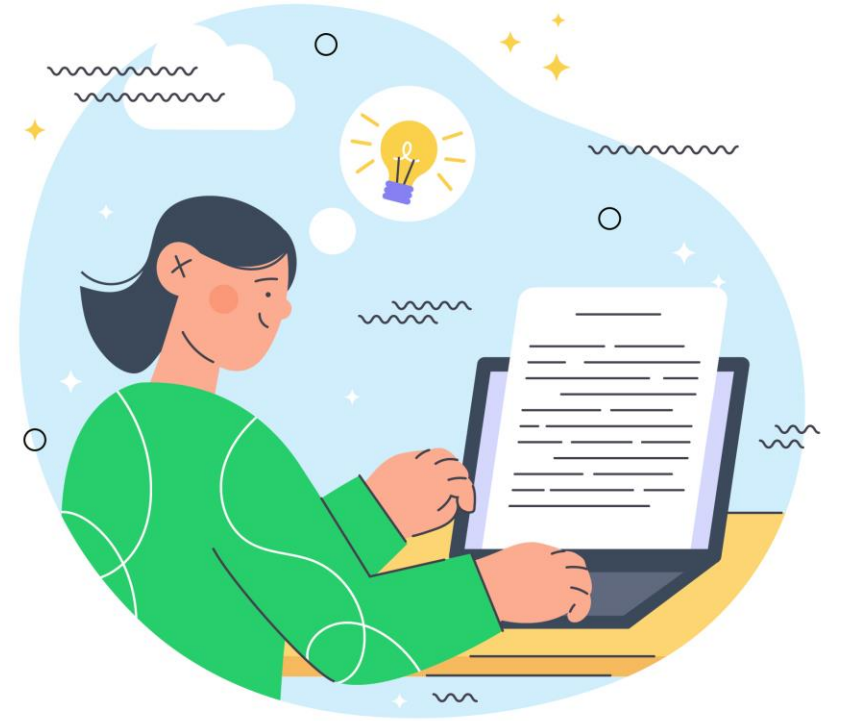
Abstract

Motivation More than half of Earth's species are contained in a mere 1.4% of its land area, but the climates of many of these biodiversity hotspots are projected to disappear as a consequence of anthropogenic climate change. There is growing recognition that spatio-temporal patterns of climate in biodiversity hotspots have shaped biological diversity over a variety of historical time-scales, yet these patterns are rarely taken into account in assessments of the vulnerability of biodiversity hotspots to future climate change. In our review, we synthesize the climatic processes that have led to the diversification of hotspots and interpret what this means in the context of anthropogenic climate change. We demonstrate the importance of mesoclimatic processes and fine-scale topographical heterogeneity, in combination with climatic variability, in driving speciation processes and maintaining high levels of diversity. We outline why these features of hotspots are crucial to understanding the impacts of anthropogenic climate change and discuss how recent advances in predictive modelling enable vulnerability to be understood better.

Location Global.

Main conclusions We contend that many, although not all, biodiversity hotspots

Writing Intelligent Queries



Why Smart Queries Matter

AI is powerful But only if you ask correctly.

Bad query:

-> “AI and school”

Better query:

-> “How does artificial intelligence impact student engagement in secondary education between 2015–2024?”

Principles of Good Academic Queries

A strong query includes:

- Clear topic
- Context
- Population
- Timeframe
- Objective

Formula:

-> Topic + Context + Population + Timeframe + Objective



Query Improvement Examples

Weak → Improved

- AI medicine → How is machine learning used for early cancer detection?
- AI risks → What ethical risks are associated with facial recognition systems?
- Big data → How does machine learning handle large user's behavior datasets in e-commerce platforms?

Write Strong Research Prompts

Step 1 Start with a Broad Topic

Example: Artificial Intelligence in healthcare

Step 2 Narrow the Focus

Ask:

- What type of AI?
- In which context?
- For whom?
- What outcome?
- In what timeframe?

Step 3 Add Precision

- Turn: AI in healthcare
- Into: How does deep learning improve early cancer detection accuracy in medical imaging after 2018?

Golden Rule :

Vague question → Vague results

Precise question → Academic-quality results



Activity: Improve the Prompts

Instructions :

- You are given weak research prompts.
- Improve them to make them:
 - Specific
 - Academic
 - Research-oriented
- Add context, objective, and clarity.

Weak prompt: AI and jobs, AI risks



Automatic Article Summarization



What is Automatic Summarization?

AI can:

- Extract the main objective
- Identify methodology
- Detect key results
- Summarize conclusions

This saves time during literature review.



Two Types of Summaries

1 Extractive Summary

Selects important sentences directly from the text

2 Abstractive Summary

Rewrites content using new wording

Important:

AI summaries simplify content but may omit details.

Example

Original: “This study investigates the impact of AI-based tutoring systems on student performance across multiple universities...”

AI summary: “The study evaluates how AI tutoring systems improve academic performance in higher education.”

AI simplifies But human verification is necessary.

Critical Evaluation of AI-Suggested Sources



AI Does NOT Guarantee Accuracy

Even academic AI tools may:

- Suggest irrelevant papers
- Miss important studies
- Generate incorrect references
- Produce hallucinated information

We must think critically.



Critical Evaluation Checklist

When AI suggests a paper, ask:

- ☐ Who is the author?
- ☐ Is it peer-reviewed?
- ☐ Which journal published it?
- ☐ What year was it published?
- ☐ What methodology was used?
- ☐ Is it cited by other researchers?

Never trust automatically.



Common Student Mistakes



- ✗ Copying AI summaries without reading the full paper
- ✗ Trusting AI-generated references blindly
- ✗ Ignoring publication date
- ✗ Not verifying DOI or journal credibility

AI supports research, It does not replace academic responsibility.

Ethical Use of AI in Academic Research



Ethical Use of AI in Academic Research

Responsible Use of AI

- Use AI as a research assistant, not a replacement
- Read original sources before citing
- Cite properly
- Apply critical thinking
- Verify all information



Academic Integrity & Plagiarism

AI and Academic Honesty

Risks:

- Copying AI-generated text without attribution
- Submitting AI-written assignments as personal work
- Using AI to fabricate references

Important: Using AI without acknowledgment may be considered academic misconduct.

AI Hallucinations

When AI Generates False Information

AI systems may:

- Invent references
- Misquote authors
- Provide incorrect statistics
- Create non-existent studies

Must:

- ✓ Verify DOI
- ✓ Check journal website
- ✓ Confirm publication details

Bias in AI-Generated Research

AI systems are trained on data.

If data contains bias → AI reproduces bias.

Examples:

- Underrepresentation of certain regions
- Gender bias in research
- Language dominance (English bias)

Researchers must critically evaluate perspectives.

Data Privacy & Confidentiality

must NOT:

- ✗ Upload confidential research data
- ✗ Share private datasets
- ✗ Input sensitive institutional documents

**AI tools may store or process user inputs.
Always respect research ethics.**



Summary: The Ethical Balance

AI in research is powerful.

But:

- It can amplify bias
- It can reduce critical thinking
- It can create dependency

Responsible AI use means:

- Using AI to enhance thinking
- Not replace thinking

