

# Navigating the New Era: The Impact of Generative AI on Information Discovery and Literacy

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Presenters:

Leo S. Lo, University of New Mexico

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# The Gen AI Revolution in Information Discovery

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- A Brief History and Development of Search
- Pros and Cons of Gen AI
- Looking Ahead



# AI-powered tool subscription

**Elias Tzoc**

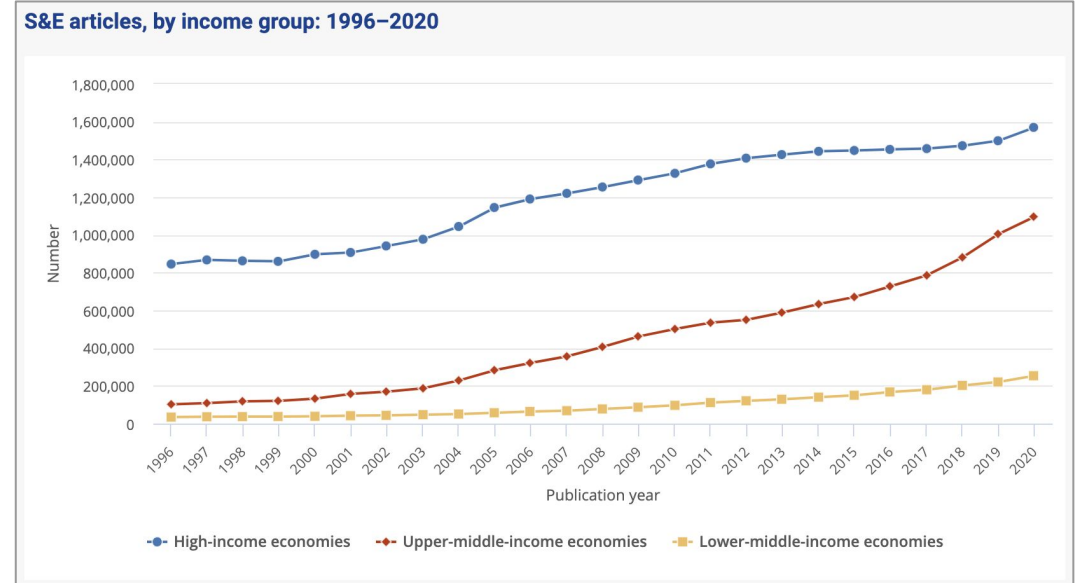
Associate Dean for Teaching, Learning and Research  
Clemson University Libraries

scite\_



## Information overload/abundance

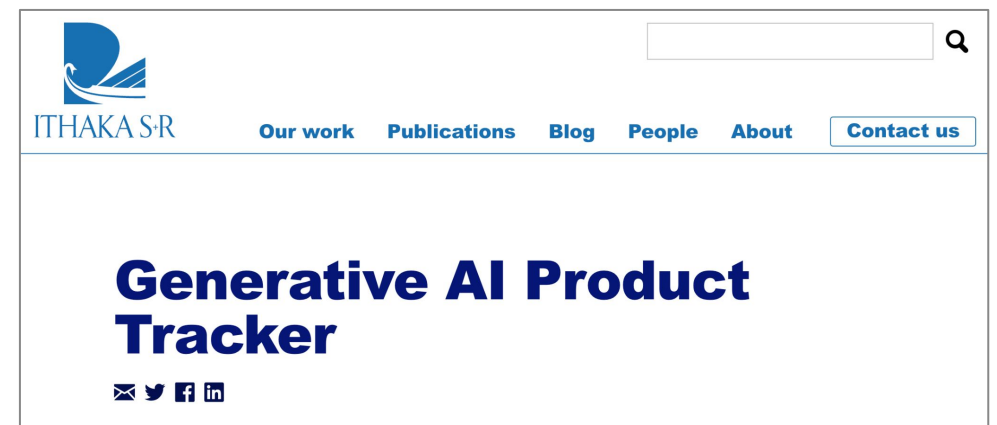
1. Exponential growth of information over the last 2-3 decades
2. Digital revolution and the emergence of online databases/journals
3. OA has increased access to the literature
4. How do we know what to trust?
5. The lack of FAIRness is an obstacle



## Gen AI tools for discovery/research

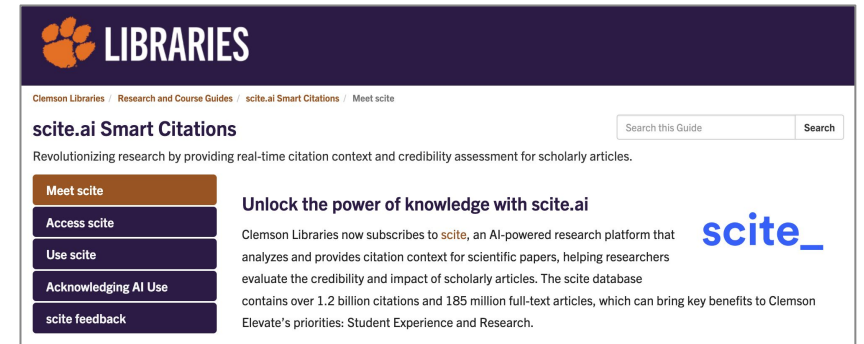
1. Dozens of AI tools available
2. Libraries and campus wide subscriptions
3. Assessment and trials (faculty and students)
4. Working with campus partners

### Top 5-10 AI Tools for Higher Education



## What have we done?

1. Created an AI group
2. Arranged demos and trials
3. Recommended a one-year subscription
4. Created a research guide (3,300+ views)
5. Co-sponsored an AI Conference (OTEI)
6. Co-authored a conference report
7. Continue to support/advocate for AI awareness

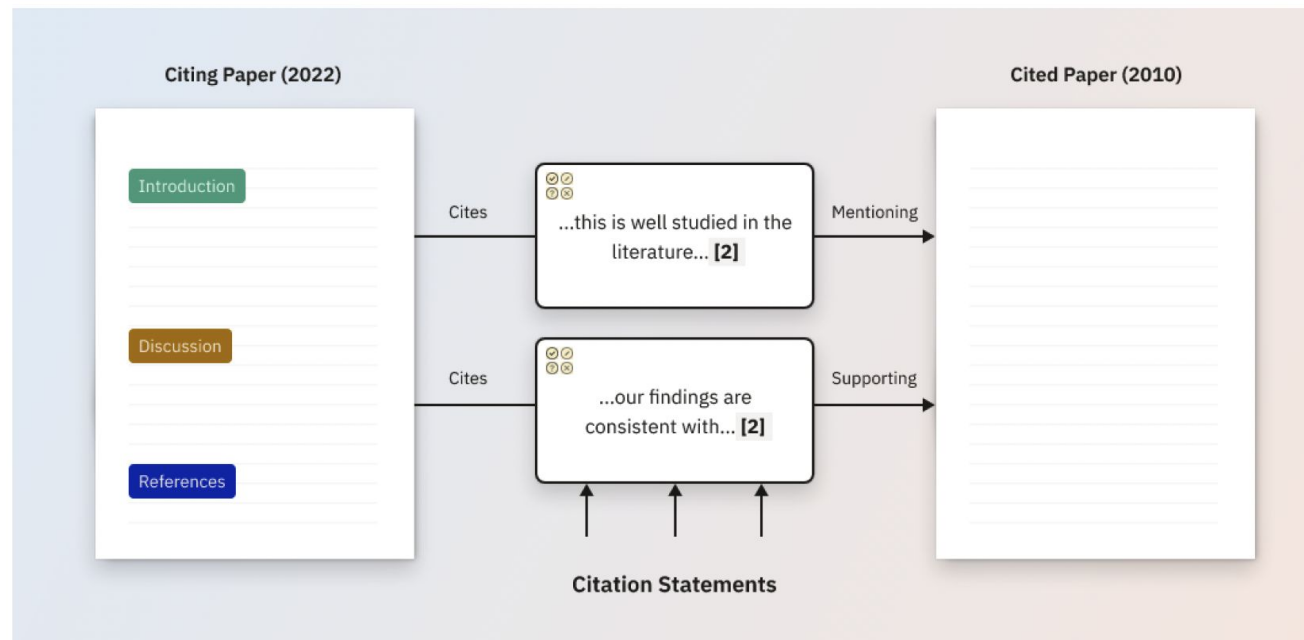


The screenshot shows the top portion of a research guide page. At the top left is the "LIBRARIES" logo. Below it is a breadcrumb trail: "Clemson Libraries > Research and Course Guides > scite.ai Smart Citations > Meet scite". To the right is a search bar with the text "Search this Guide" and a "Search" button. The main heading is "scite.ai Smart Citations" with a sub-heading "Revolutionizing research by providing real-time citation context and credibility assessment for scholarly articles." Below this is a vertical menu with five items: "Meet scite" (highlighted in orange), "Access scite", "Use scite", "Acknowledging AI Use", and "scite feedback". To the right of the menu is a section titled "Unlock the power of knowledge with scite.ai" with the "scite\_" logo. The text below reads: "Clemson Libraries now subscribes to scite, an AI-powered research platform that analyzes and provides citation context for scientific papers, helping researchers evaluate the credibility and impact of scholarly articles. The scite database contains over 1.2 billion citations and 185 million full-text articles, which can bring key benefits to Clemson Elevate's priorities: Student Experience and Research."



The poster features a diagonal orange and white design on the left side with a white paw print logo. The main text reads: "Clemson Teaching Excellence Conference 2024: Teaching in the Age of AI". Below this is the event information: "Save the Date! Tuesday, January 9, 2024 8 a.m. to 4 p.m. Watt Family Innovation Center Auditorium". A photo of Mitch Shue is shown on the right. Below the photo is his name and title: "Mitch Shue, Keynote Speaker Professor of Practice, School of Computing, and Executive Director, AI Research Institute for Science and Engineering (AIRISE)". At the bottom, it lists sponsors: "Sponsored by: the Office of Teaching Effectiveness and Innovation, Clemson Libraries, Watt Family Innovation Center, the Center for Career and Professional Development and the Rutland Institute for Ethics." and a note: "Accommodations are available by request. Please email cdancz@clemson.edu as early as possible to ensure availability."

A smart citation index that displays the context of citations and classifies their intent using DL.



**Find if research has been supported or contrasted**

It is used by students and researchers from around the world ... initially funded in part by the NSF and NIH ... was acquired by Research Solutions in November 2023.

## ChatGPT is outdated, and doesn't care about real references

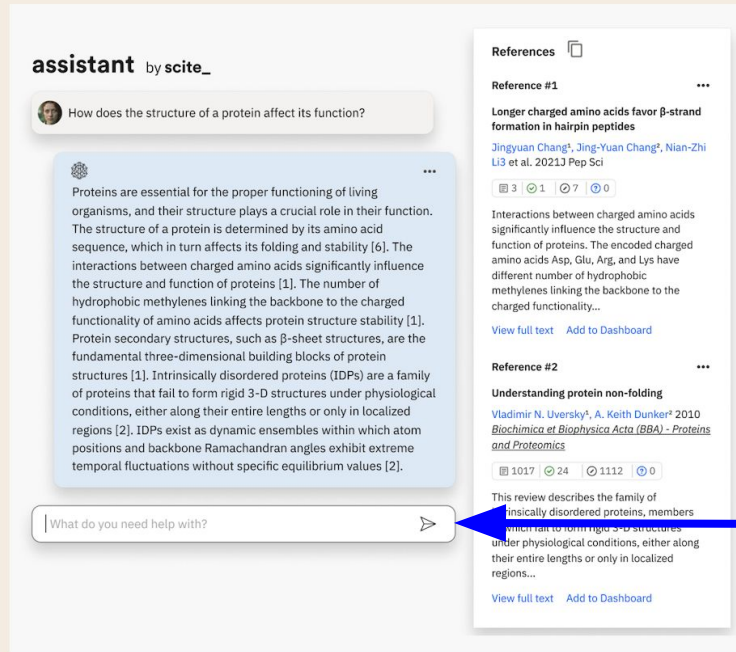
### Assistant by scite does, by:

- Augmenting language models by searching for *new* information in our system
- Adding guardrails for claims by language models to ensure they're grounded in real research.
- Giving you observability into the search strategies used, and why references are being recommended

Backed by our unique database of Smart Citations.

cataloged over  
**1.8 billion**  
references made  
between articles

indexed over  
**1.2 billion**  
citation statements  
from full-text articles



**assistant** by scite\_

How does the structure of a protein affect its function?

Proteins are essential for the proper functioning of living organisms, and their structure plays a crucial role in their function. The structure of a protein is determined by its amino acid sequence, which in turn affects its folding and stability [6]. The interactions between charged amino acids significantly influence the structure and function of proteins [1]. The number of hydrophobic methylenes linking the backbone to the charged functionality of amino acids affects protein structure stability [1]. Protein secondary structures, such as  $\beta$ -sheet structures, are the fundamental three-dimensional building blocks of protein structures [1]. Intrinsically disordered proteins (IDPs) are a family of proteins that fail to form rigid 3-D structures under physiological conditions, either along their entire lengths or only in localized regions [2]. IDPs exist as dynamic ensembles within which atom positions and backbone Ramachandran angles exhibit extreme temporal fluctuations without specific equilibrium values [2].

What do you need help with?

**References**

**Reference #1**

**Longer charged amino acids favor  $\beta$ -strand formation in hairpin peptides**

Jingyuan Chang<sup>1</sup>, Jing-Yuan Chang<sup>2</sup>, Nian-Zhi Li<sup>3</sup> et al. 20213 Pep Sci

Interactions between charged amino acids significantly influence the structure and function of proteins. The encoded charged amino acids Asp, Glu, Arg, and Lys have different number of hydrophobic methylenes linking the backbone to the charged functionality...

**Reference #2**

**Understanding protein non-folding**

Vladimir N. Uversky<sup>1</sup>, A. Keith Dunker<sup>2</sup> 2010 *Biochimica et Biophysica Acta (BBA) - Proteins and Proteomics*

This review describes the family of intrinsically disordered proteins, members of which fail to form rigid 3-D structures under physiological conditions, either along their entire lengths or only in localized regions...

**Assistant:  
The Power of Language  
Models, Backed by Real,  
Up to Date Research.**



### My Profile

 [Welcome \(43%\)](#)

 [Feed](#)

 [Bio](#)


### Tools

 [Dashboards](#)

 [Reference Checks](#)

 [Saved Searches](#)

 [Alerts](#)

 [Help & Tutorials](#)

### My Research

## Welcome to scite!



In order to get the most out of scite, we encourage you to:

Try scite Assistant, a ChatGPT for research with answers from scientific literature [→](#)

Install our free browser extension to see Smart Citations wherever you read research [→](#)

Take a tour of the scite report page to see what was said about a paper's claims [→](#)

Use our unique Citation Statement Search to find expert insights from research papers [→](#)

Complete your profile [→](#)

### Features



#### Assistant

Your AI-powered research partner.



#### Search

Search Citation Statements directly for relevant facts and insights.



#### Custom Dashboards

Track trends and get insights from groups of papers.



#### Reference Check

Screen manuscripts as you write to ensure you're using high quality references.

### Free Resources



#### Browser Extension

Take the power of scite wherever you read research online.



#### Badge

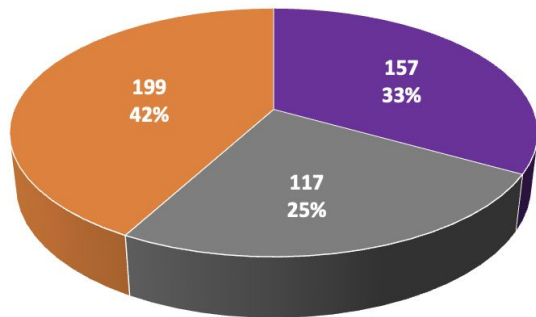
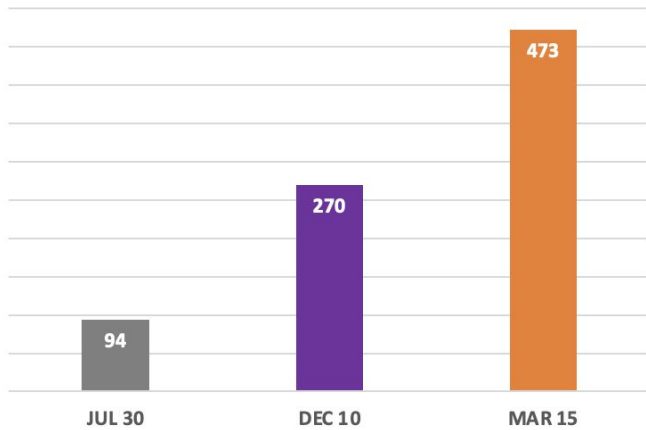
Embed the free scite Citation or Section Badge into your website.



#### Zotero Plugin

Get scite Smart Citation data in your Zotero library.

# scite users & top 5 majors/departments



■ Graduates ■ Employees ■ Undergraduates

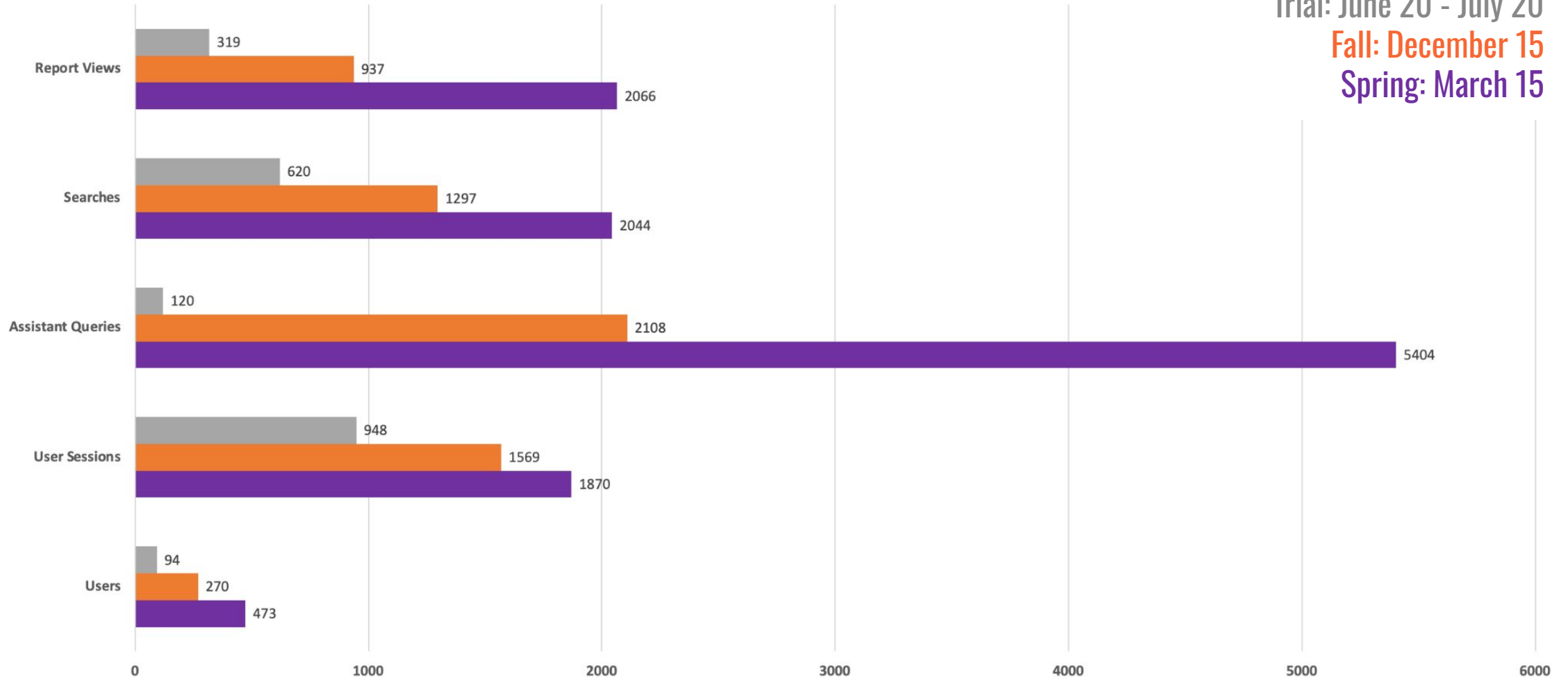
- Undergrads**
- Psychology, BA
  - Construction Science and Management, BS
  - Parks, Recreation and Tourism Management, BS
  - Computer Science, BA
  - Automotive Engineering, Baccalaureate Certificate

- Grads**
- Teaching and Learning, MEd
  - Human Centered Computing, PhD
  - Business Administration, PhD
  - Industrial/Organizational Psychology, PhD
  - Wildlife and Fisheries Biology, PhD

- Employees**
- Management
  - Plant & Environmental Sciences
  - Teaching & Learning
  - Psychology
  - Parks Recreation & Tourism Management

# scite user engagement

Trial: June 20 - July 20  
Fall: December 15  
Spring: March 15



# scite & institutional data

*Clemson University*  Set alert   

Official Page: <http://www.clemson.edu/> Wiki Page: -




Clemson University has 55,863 publications in the scite database. These publications have received 831,309 citation statements of which 33,227 indicate supporting evidence, 3,661 indicate contrasting evidence, and 778,701 are mentioning.

### Total Articles

**56k**

55,863 total publication(s).

### Citation Types

	Supporting	33,227
	Mentioning	778,701
	Contrasting	3,661
<hr/>		
	Total	831,309

### Editorial Notices

<a href="#">Retractions</a>	15
<a href="#">Withdrawals</a>	4
<a href="#">Corrections</a>	101
<a href="#">Errata</a>	122
Expression of Concern	0

### 2023 scite Index<sup>ⓘ</sup>

<b>N/A</b>	
5-year SI	
<b>N/A</b>	<b>N/A</b>
2-year SI	Lifetime SI

## What have we learned and what's next?

- Get faculty and students involved
- Schedule demos and training sessions
- Check for discipline coverage
- Check for accessibility requirements
- Document user engagement
- Continue to assess





# GenAI in scholarly search

## *what we are learning from users*

**Emily Singley**

VP, North American Library Relations, Elsevier

March 25, 2024

CNI Spring Meeting



# One year ago - Exploration

Judson Dunham: "Literature research is clumsy and annoying: can we break the *3-words -> 10,000 papers paradigm?*"

Questions not queries

Answers not articles

Passages not papers

Scannable, digestible, immediate, exact

Authored, edited, peer reviewed, curated

Verifiable, citable, **linked to source documents**



[2023 Spring CNI Presentation: AI-Human Collaboration](#)

# 2024 – GenAI is here

- Scopus AI launched in January 2024
- Natural language searching
- Immediate summary generation
- Linking out to Scopus source documents
- Built with LLM, vector search, and custom prompt engineering
- RAG Fusion Technology – Retrieval-Augmented Generation

Documents Authors Researcher Discovery Organizations **Scopus AI** New

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

What would you like to learn more about?  
what is a retrieval augmented generation model?

## what is a retrieval augmented generation model?

### Summary

A retrieval-augmented generation model is a blend of retrieval-based and generative models that actively involve large language models in retrieval to guide generation, addressing limitations such as outdated knowledge and hallucinations [1](#) [2](#) . Here's a breakdown of the key points:

- **Definition:** A retrieval-augmented generation model synergizes retrieval and generation in an iterative manner, using a model's response to a task input as context for retrieving more relevant knowledge, ultimately improving the generated response [1](#) .
- **Applications:** The model has been successfully implemented in educational settings to enhance student learning by providing contextually relevant answers, transforming the educational process into an efficient and interactive learning experience [3](#) .
- **Challenges and Solutions:** The model addresses challenges faced by large language models, such as hallucinations and factually inaccurate output, by actively deciding when and what to retrieve throughout the generation process, leading to superior or competitive performance across various tasks [4](#) [5](#) .
- **Training and Performance:** Research has shown that the quantity and quality of context during model training significantly affect the model's performance, with overfitting to specific context quality being a

### References

- 1 Enhancing Retrieval-Augmented Large Language Models with Iterative Retrieval-Generation Synergy  
Shao Z., Gong Y., Shen Y., (...), Chen W.  
*Findings of the Association for Computational Linguistics: EMNLP 2023* [↗](#)  
2023
- 2 Context Quality Matters in Training Fusion-in-Decoder for Extractive Open-Domain Question Answering  
Akimoto K., Takeoka K., Oyamada M.  
*Findings of the Association for Computational Linguistics: EMNLP 2023* [↗](#)  
2023
- 3 BUILDING A RETRIEVAL-AUGMENTED GENERATION SYSTEM FOR ENHANCED STUDENT LEARNING: CASE STUDY AT PRIVATE UNIVERSITY  
Triwicaksana S M.B., Oktavia T.  
*Journal of Theoretical and Applied Information Technology* [↗](#)  
2023



# Science Direct: experimenting with Generative AI



We've been exploring utilizing GenAI to make finding, extracting, synthesizing and summarizing what researchers need from the literature more effective and less time consuming than it is today

## Experiment on 1k topic pages: Pre-generated questions & answers on a topic

**Data Fusion**  
Multisensor data integration and fusion can be described as the synergistic use of information from multiple sources to assist in the overall understanding of a phenomenon and to measure evidence or combine decisions.

**Common questions** AI-generated

What is data fusion?

What are the benefits of data fusion?

Data fusion has several benefits(Dionysis Bochtis, 2020), including increased confidence, reliable navigation information, elevated spatial and temporal covering, improved separability, increased system resilience, and an effective solution for handling big data. Data fusion enables the combination of data obtained by multisensory networks with data fusion framework (Dionysis Bochtis, 2020), which enables faster and lower cost processing, additionally to lowering the level of uncertainty hence guaranteeing higher reliability. The fusion of datasets from different sources enables the pre-trained LMs to train on more task features which would not be possible using any one single dataset(Sherif Abdou et al., 2022). The main criterion that concerns the optimization of fusion function is the minimal error of identification of the fusion decision compared to actual situation(Dionysis Bochtis, 2020)

**Utilization of multisensors and data fusion in precision agriculture**

Xanthoula Eirini Pantazi, ... Dionysis Bochtis, in Intelligent Data Mining and Fusion Systems in Agriculture, 2020

**3.2.2 Data fusion advantages** The combination of data obtained by multisensory networks with data fusion framework enables a faster and lower cost processing, additionally to lowering the level of uncertainty hence guaranteeing higher reliability. These data can be fused in a variety of ways, for instance: linear combiner, combination of posteriors and product of posteriors. The advantages of data fusion compared to classical algorithms include: 1. Increased confidence that is a consequence of the complementary nature of the antecedent sources of information; 2. Reliable navigation information regarding position and state estimation in noisy and rapidly changing environments (limited visibility, overlapping objects); 3. Elevated spatial and temporal covering of important regions of interest and effective tackling of the dimensionality of the input space; 4. Improved separability when comparing hypotheses thanks to fuller and more relevant information availability; 5. Increased system resilience with self-healing capability regarding information in the event that one or more sensors are in a fault condition; 6. An effective solution for handling the big data that become available from sensor information and other sources like social media, remote sensing and open data repositories. The main criterion that concerns the optimization of fusion function is the minimal error of identification of the fusion decision compared to actual situation.

[Read full chapter](#) [View PDF](#) [Explore book](#)

## Experiment on 20k articles: Pre-generated questions & answers on the full-text article

[View PDF](#) [Download full issue](#)

**Outline**

**Abstract** AI-generated Beta

**Keywords** AI-generated Beta

1. Introduction

2. Background

3. Issues in internet of things

4. Impact of integration of IoT, blockchain and...

5. Collaborative security by integrating IoT, blo...

6. Use cases of blockchain-based IoT using ho...

7. Challenges and future research direction

8. Summary

**References**

[Further Reading / References of Advance](#)

**Glossary**

**Video**

[Show full outline](#)

**Cited by (51)**

**Figures (6)**

challenges and possible future research directions in the integrated blockchain-based IoT with homomorphic encryption.

Previous chapter in volume | Next chapter in volume

**Questions answered in this article** AI-generated Beta

What are the limitations of homomorphic encryption?

What are the three categories of homomorphic encryption schemes?

What is the fully homomorphic encryption (TFHE) scheme and how is it used in homomorphic encryption?, open AI generated answer

How does homomorphic encryption differ from traditional public-key encryption?

What is homomorphic encryption?

**Keywords**

Blockchain; Internet of Things; Homomorphic Encryption; Security; Privacy; Smart city

**1. Introduction**

With the rapid development of internet and technology, we are in the fourth industrial revolution or Industry 4.0, where everything will be connected with each other in the cy world. The Industry 4.0 will bring a huge revolution in the convergence of technologies such as big data, AI, robotics, internet of things, 5G, cloud computing, blockchain, and cryptocurrency. The Internet of Things (IoT) has a huge potential to provide different types of exhilarating services across many areas from industry, business, Intelligent Transportation System (ITS), social media, healthcare and smart cities. The IoT is a network

**Questions answered in this article** AI-generated Beta

What are the limitations of homomorphic encryption?

Homomorphic encryption has several limitations. One of the main limitations is the computational overhead, which makes it slower than traditional encryption methods. Another limitation is the size of the plaintext and cipher-text, which can be significantly larger than the original data. Additionally, homomorphic encryption is currently only practical for specific types of computations, such as addition and multiplication, and cannot be used for more complex operations. Finally, homomorphic encryption is vulnerable to side-channel attacks, which can leak information about the encrypted data through its execution time or power consumption.

Is this helpful?  Yes  No

What are the three categories of homomorphic encryption schemes?

What is the fully homomorphic encryption (TFHE) scheme and how is it used in homomorphic encryption?, open AI generated answer

How does homomorphic encryption differ from traditional public-key encryption?

What is homomorphic encryption?

**Keywords**

Blockchain; Internet of Things; Homomorphic Encryption; Security; Privacy; Smart city

- Example of Q&A:  
<https://www.sciencedirect.com/science/article/pii/S000437022030062X#questions-and-answers> - PopMNet Generating Structured Pop Music Melodies
- Example of Topic Page:  
<https://www.sciencedirect.com/topics/computer-science/data-fusion>

# Developing with the **research community**

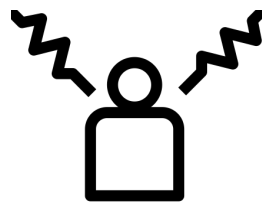
- Alpha testing – access given to randomized group of users
- Beta testing – thousands of users responded to calls for UX testers (including on library listservs)
- Proactively approached both individual users and institutions
- Also leveraged findings from prior UX testing, focus groups



**Validate**  
user need



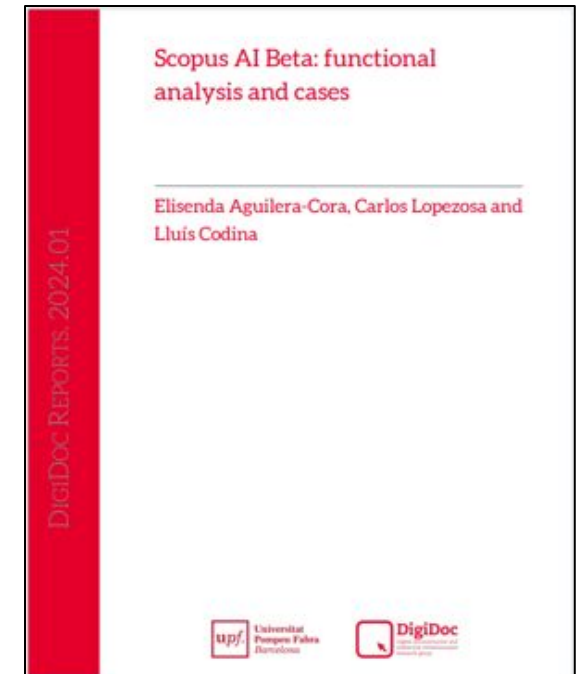
**Understand**  
researcher journey



**Identify**  
pain-points



**Test**  
new ideas



[Scopus AI Beta preprint](#)





**What we are learning  
from users**

# 1) GenAI should live side-by-side with “classic” search

Start exploring

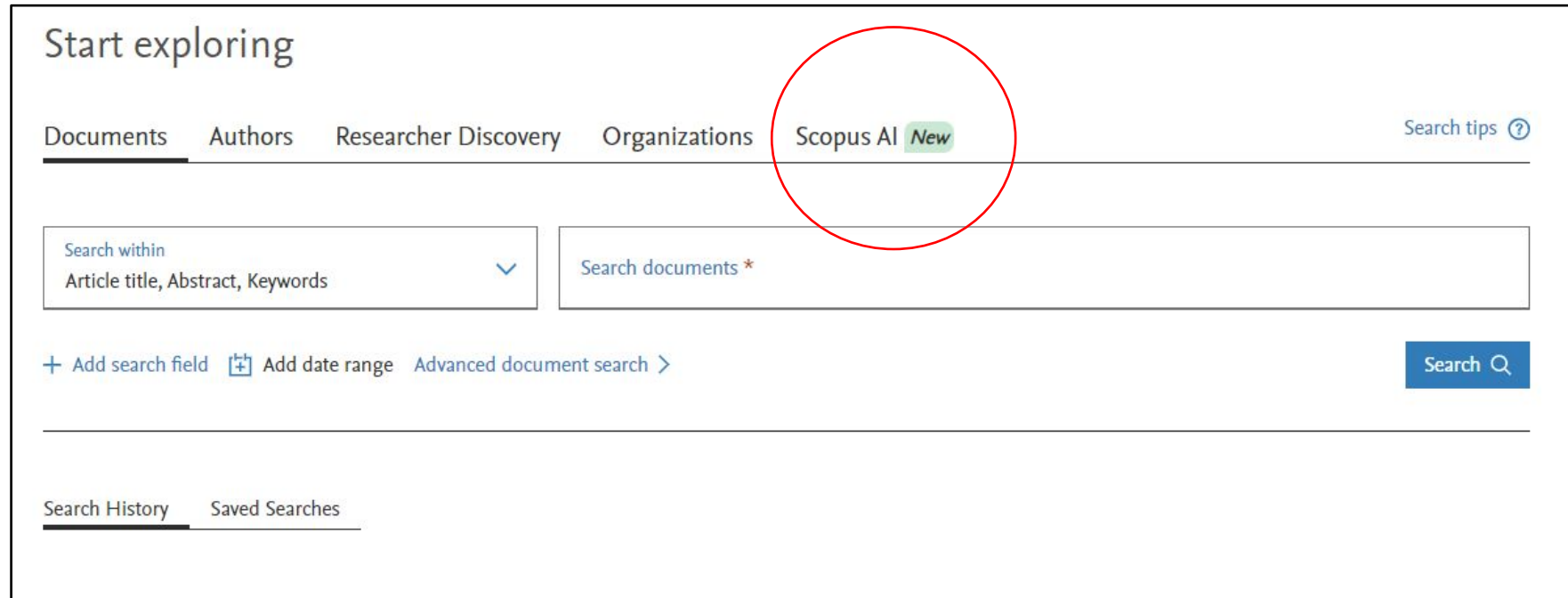
[Documents](#) [Authors](#) [Researcher Discovery](#) [Organizations](#) [Scopus AI New](#) [Search tips ?](#)

Search within  
Article title, Abstract, Keywords

Search documents \*

+ Add search field + Add date range [Advanced document search >](#) [Search](#)

[Search History](#) [Saved Searches](#)

The image shows a screenshot of the Scopus search interface. At the top, there is a navigation bar with several options: 'Documents', 'Authors', 'Researcher Discovery', 'Organizations', 'Scopus AI', and 'Search tips'. The 'Scopus AI' option is highlighted with a red circle and has a small green 'New' badge next to it. Below the navigation bar, there is a search area with a dropdown menu for 'Search within' (currently set to 'Article title, Abstract, Keywords') and a text input field for 'Search documents \*'. Below the search area, there are links for '+ Add search field', '+ Add date range', and 'Advanced document search >'. A blue 'Search' button is located to the right of these links. At the bottom of the page, there are links for 'Search History' and 'Saved Searches'.

## 2) The paper still matters – a lot!

- Users want links to papers and references to be prominently displayed in the UI

Documents Authors Researcher Discovery Organizations Scopus AI **New**

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

What would you like to learn more about?  
how are libraries approaching information literacy for generative ai

### how are libraries approaching information literacy for generative ai

Summary

Based on the abstracts provided, there is relevant information to address the query about how libraries are approaching information literacy for generative AI.

**Libraries' Role in Facilitating Informed Use of Generative AI:**

- Libraries have a unique role in facilitating informed and responsible use of generative artificial intelligence (GenAI) and large language models (LLMs) [1](#) .
- They play a crucial role in safeguarding and promoting the values of access, privacy, and intellectual freedom in the context of GenAI [1](#) .

**Challenges and Opportunities for Libraries:**

- Zambian librarians demonstrate a solid understanding of AI fundamentals and positive attitudes towards AI's potential benefits in library services, but acknowledge challenges such as the need for enhanced AI expertise and budgetary constraints [2](#) .
- Academic libraries are urged to promote AI literacy, involve librarians in AI implementation, and prepare for

References

- 1 Generative Artificial Intelligence: 8 Critical Questions for Libraries  
Bridges L.M., McElroy K., Welhouse Z.  
*Journal of Library Administration* ↗ 2024
- 2 AI Literacy and Zambian Librarians: A Study of Perceptions and Applications  
Alam A.F., Subaveerapandiyana A., Mvula D., Tiwary N.  
*Open Information Science* ↗ 2024
- 3 An initial interpretation of the U.S. Department of Education's AI report: Implications and recommendations for academic libraries  
Lo L.S.  
*Journal of Academic Librarianship* ↗ 2023

### 3) Users wanted to be able to surface influential / seminal authors

- Users asked whether we could identify influential authors and seminal works in response to their questions
- We experimented with highlighting seminal works and experts based on citation relationships
- The result was the addition of:
  - Foundational Documents
  - Topic Experts

The screenshot displays a user interface with two main sections. The 'Topic experts' section lists three individuals: Nicolás N. Yunes, Grit G. Kalies, and Cosimo C. Bambi. Each entry includes their name, citation count, matching documents, and h-index, followed by a brief bio and a 'Preview profile' link. The 'Foundational documents' section lists two seminal works by Albert Einstein, each with its citation count, title, author, and publication year in *Annalen der Physik*.

**Topic experts**

**Yunes, Nicolás N.**  
5,650 citations | 13 matching documents | 65 h-index  
Nicolás Yunes is an expert in the theory of relativity and physics, particularly in the constraints and alternative theories of gravity. Their recent publications focus on gravitational wave polarizations, precessing binaries, and neutron star equation of state expertise in the field.  
[Preview profile](#)

**Kalies, Grit G.**  
464 citations | 5 matching documents | 13 h-index  
Grit Kalies is an expert in the energetic foundations of physics and the concepts of fundamental to the theory of relativity. Their recent publications delve into momentum, entropy, and matter-energy equivalence, showcasing their expertise in the theoretical relevant to the theory of relativity.  
[Preview profile](#)

**Bambi, Cosimo C.**  
3,207 citations | 9 matching documents | 48 h-index  
Cosimo Bambi is an expert in testing general relativity with black hole X-ray data and horizon-scale tests of


**Foundational documents**

**2,048 citations**  
Zur Elektrodynamik bewegter Körper  
A., Einstein, Albert  
*Annalen der Physik* ↗ 1905

**357 citations**  
Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig?  
A., Einstein, Albert  
*Annalen der Physik* ↗ 1905

## 4) Short summaries aren't always enough

- Users expressed the need for longer, more in-depth summaries
- But they also liked the short summary for quick insights
- Kept the short summary as default, added an “expanded summary” dropdown option

Expanded summary 

The evolution of information literacy in academic libraries has been marked by several key milestones, changes in the role of libraries, current challenges, and emerging trends and technologies shaping the future. Here's a breakdown of the key points based on the relevant abstracts:

**Key Milestones in the Evolution of Information Literacy in Academic Libraries:**

- Information literacy (IL) has evolved from traditional bibliographical instruction to a multidisciplinary field, no longer restricted to social sciences, and spread across 27 disciplines [1](#) .
- New literacies have emerged, including digital literacy, media literacy, health literacy, business information literacy, metaliteracy, content literacy, workplace information literacy, scientific literacy, and science literacy [1](#) .
- The development of information literacy as an area of study coincided with the institutionalization of instruction programs, giving academic context and form to the curricula for instruction in the use of academic libraries [2](#) [3](#) .

**Evolution of the Role of Academic Libraries in Promoting Information Literacy:**

- Academic libraries have intensified their efforts to promote and deliver information literacy on the web, with a significant increase in IL-related activities on library websites between 2009 and 2012 [4](#) .
- The role of librarians has changed, and they are expected to play a key role in extending the cognitive abilities of users to make information literacy a success [5](#) .

**Current Challenges and Opportunities in the Development of Information Literacy Programs in Academic Libraries:**

- Academic libraries face challenges in marketing and delivering information literacy on the web, with the need for better strategies for advocating information literacy [6](#) .
- The decline in the use of libraries due to the advent of computers and information communication technologies presents challenges that affect the provision of needed services in libraries, requiring them to adopt alternative services to remain relevant in the information age [7](#) .





# Interested?



Contact Emily:  
[e.singley@elsevier.com](mailto:e.singley@elsevier.com)

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# What are the implications of these changes?

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- Transforming Roles & Skill
  - AI Literacy and Competencies
  - Integrating Gen AI into Information Literacy
- ARL Library Leaders' Views





# Q & A

Emily Singley -  
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leolo@unm.edu



Elias Tzoc -  
etzoc@clemson.edu



<https://www.linkedin.com/in/leoslo/>